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Staff Memo

Money and credit in Norway

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Money and Credit in Norway

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Abstract

The recent turmoil in the global financial markets raises questions about the nature of the downturn of the Norwegian economy. In particular, are worsening credit market conditions also a leading cause of the Norwegian 2009 recession? In order to shed some light on these questions, this note investigates the historical behavior of different money and credit series and their relationship with real economic activity as measured by growth in GDP Mainland Norway.

1 Introduction

The recent turmoil in the global financial markets raises questions about the nature of the downturn of the Norwegian economy.¹ In particular, are worsening credit market conditions also a leading cause of the Norwegian 2009 recession? In order to shed some light on these questions, this note investigates the historical behavior of different money and credit series and their relationship with real economic activity as measured by growth in GDP Mainland Norway.

The first part is a brief overview of the relative importance of various disaggregate series of the broadest money and credit measures. The second part investigates the relationship between real economic activity and money and credit and, importantly, whether a structural break occurred in these relations that indicates a credit crisis. It does so from a historical perspective using quarterly year-on-year (yoy) growth rates. The second part concludes with a look at the developments of the last months for some series that have been identified important in the foregoing analysis. I find that the identified historical relations continue to hold and, therefore, that there is little empirical support for a credit crisis based on our data.

Additionally, two monetary disaggregate series, M1 and M2 held by non-financial enterprises, are identified as leading indicators for real economic activity. The third part presents results on the forecasting performance of statistical models that incorporate these two series as predictors for real GDP growth.

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¹This note is a short summary of the project entitled “Money and Credit and Real Activity in Norway”. The views expressed are the author’s and do not necessarily reflect those of Norges Bank.

2 The Relative Importance of Disaggregate Money and Credit Series

Figures 1 and 2 show shares of some disaggregate money and credit series computed with 2008 data. Figure 1 illustrates the importance of external developments for credit to Norwegian enterprises and households. C3 is the amount of total credit from external sources (foreign credit) as well as from domestic sources (C2). The share of foreign credit to total credit is 15% of C3; the share of domestic credit denominated in foreign currency to total C2 is about 6%. These measures indicate that while external developments can be important, the by far largest part of credit in Norway is denominated in NOK and given by domestic sources.

Figure 2, left graph, decomposes C2 by sources. It shows that the two major sources of credit are private banks as well as mortgage companies. Other sources are of minor importance. The share of mortgage companies has increased strongly over the last three years. Turning to the debtors of C2, households' debt is 58% of C2 while non-financial enterprises' debt comprises 35% (not shown).

Figure 2, right graph, shows the relative size of components of broad money (M2). M1 (currency and transaction deposits) is the largest part with a share of 51% followed by "other", less liquid deposits (41%). Turning to the holders of M2, 52% of M2 is held by households, 34% of M2 is held by non-financial enterprises (not shown).

3 Are Money and Credit Series Indicating a "Credit Crisis"?

Figures 3 and 4 show the historical behavior of quarterly money and credit series together with yoy growth in seasonally adjusted GDP Mainland Norway (YMN). All growth rates shown in the following are yoy growth rates in real terms unless otherwise stated. While some series are available at an earlier date than others, the latest shown observation is of

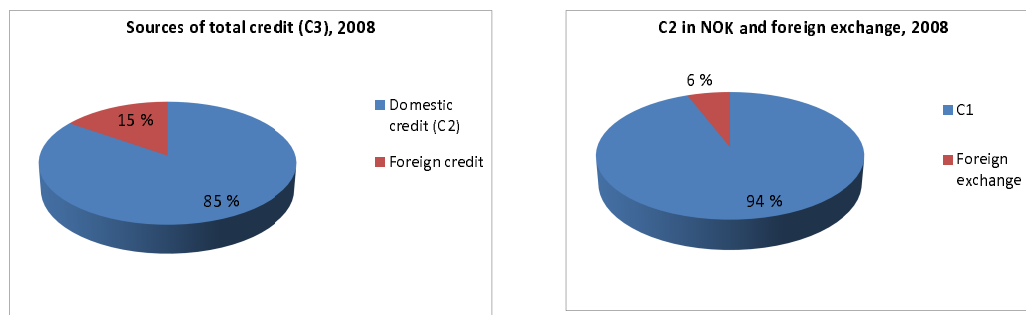


Figure 1: Decompositions of Total Credit (C3) and Domestic Credit (C2)

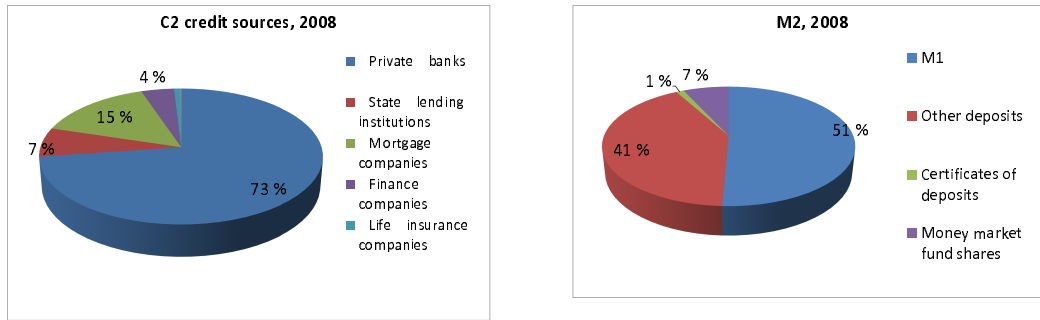


Figure 2: Decompositions of Domestic Credit (C2) and M2.

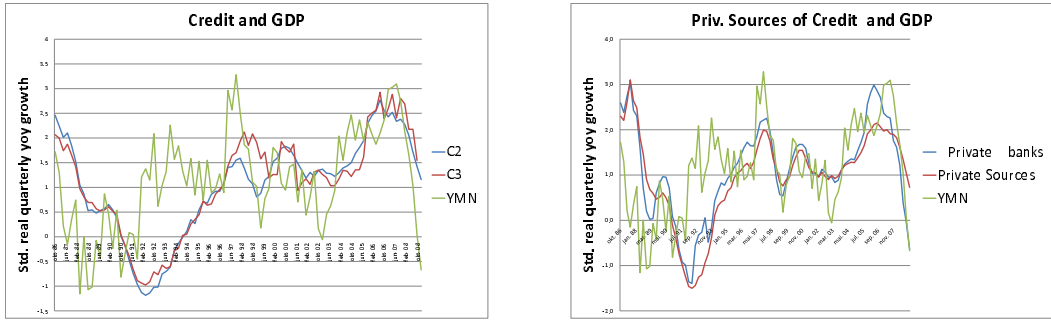
2009 Q1 for all series. The CPI index without energy and taxes was used to deflate the money and credit series. All growth rates are standardized by their historical variability. This is necessary in order to judge whether recent movements in the series are small or large by historical standards.

Figure 3 shows credit series together with GDP Mainland Norway. The broad credit aggregates, C3 and C2, appear to lag developments in real activity. Most importantly, this appears to be the case also in this recession. The magnitude of the recent decline in credit growth is in line with historical data and even moderate compared to the credit crisis in the late 80s/early 90s.

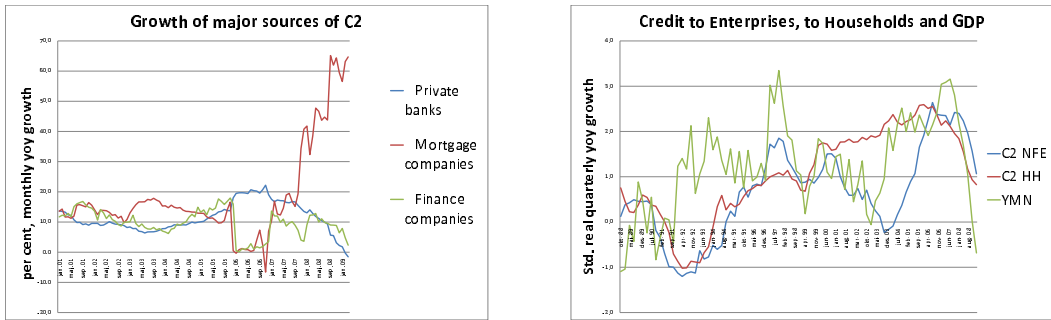
Similar patterns can be observed for the growth rates of the major sources of C2, credit given by private banks and private sources. While the fall in growth rates of credit given by private banks is more pronounced in the current recession than in earlier recessions, a large part is due to a change in the decomposition of C2 by sources. Due to new legislation on covered bonds, loans are increasingly transferred from private banks to mortgage companies as can be seen in the graph on the lower left. Therefore, credit given by private sources which includes credit from private banks, mortgage companies and financial companies is also shown in the graph on the upper right. This series shows that credit given by the private sector has grown much more slowly recently but, overall, the slowdown is in line with historical patterns and much less than the decline in credit growth from private banks alone.

Finally, the C2 series can be decomposed in terms of debtors. Households' debt (C2 HH) is rather weakly linked to YMN. However, the downward movement in C2 HH started already at the end of 2006 and is large but not excessive compared to historical standards. The growth in credit given to non-financial enterprises (C2 NFE) also lags developments in real activity - generally and also in the current recession. Despite the recent sharp decline, C2 NFE still displays historically high growth rates.

Figure 4 displays growth rates in monetary aggregates together with YMN growth rates. The figure shows that most monetary aggregates are positively correlated with YMN, as one would expect. The upper graph shows that M2 is contemporaneously



(a) Credit, Credit Sources and GDP



(b) Sources and Holders of Domestic Credit (C2).

Figure 3: Quarterly Credit Series and GDP Mainland Norway

following YMN or even lagging YMN. Additionally, there are episodes such as the late 80s when the positive correlation breaks down (not shown here). Thus, M2 might not be a good predictor of future developments. However, M1 is leading movements in GDP. Turning points of previous business cycles were first seen in M1. The lower graph shows M2 held by households (M2 HH) and M2 held by non-financial enterprises (M2 NFE). As can be seen, also M2 NFE is leading movements in YMN by 2-3 quarters. In contrast, M2 HH is very weakly linked to movements in YMN and is therefore unlikely to contain much predictive value. The recent downturn resembles earlier episodes in that the relations between monetary aggregates and YMN remain seemingly stable.²

Figures 5 and 6 show some money and credit series over the last months until April 2009. Here, we show only non-standardized real yoy growth rates for M1, M2 NFE, C2, C2 NFE and sources of C2. Most monthly figures show that the series continue to follow trends consistent with the patterns observed in the quarterly figures: Given that most credit series usually lag YMN, a further decline in credit growth was expected. Growth in credit given by private banks now turned even negative but part of this decline may

²Exceptions are the components of M0 which contains currency in circulation and banks' current accounts with Norges Bank (not shown). The latter component increased dramatically with the beginning of the financial crisis in September 2009.

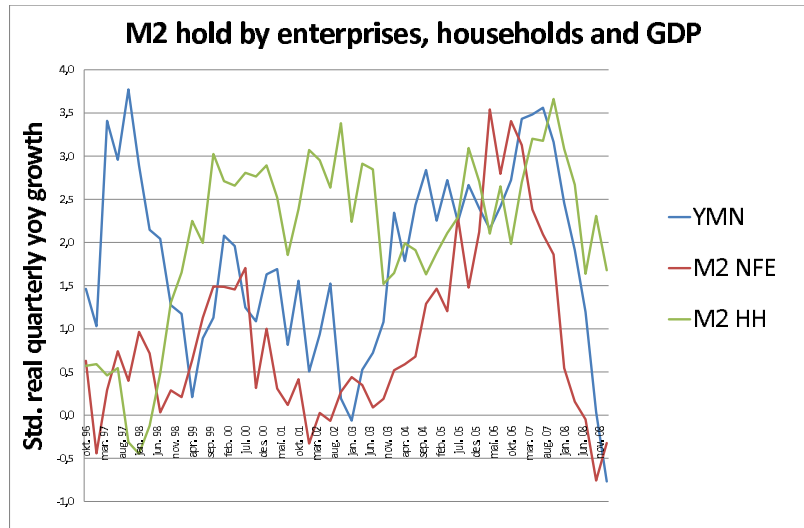
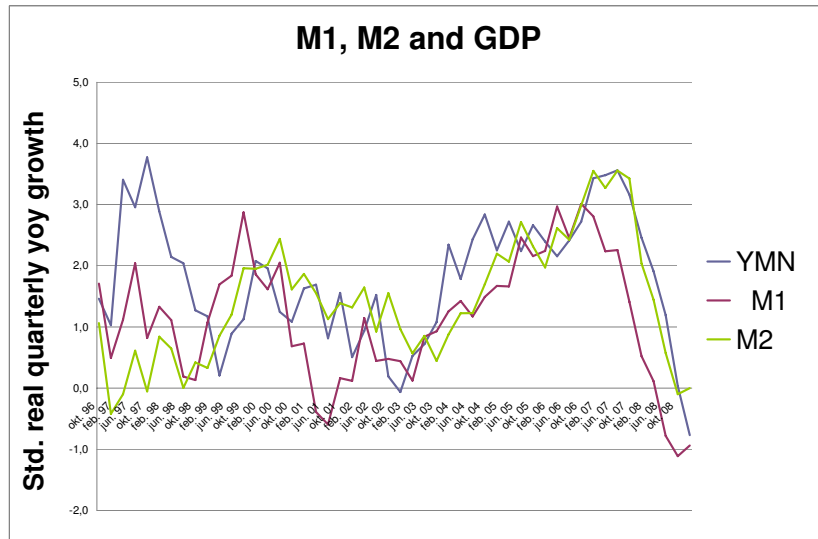


Figure 4: Quarterly Money Series and GDP Mainland Norway

still be due to the ongoing shift of loans from private banks to mortgage companies. On the other hand, the decline in the growth rates of M1 and M2 NFE clearly halted. Given previous joint patterns of these monetary series with YMN, this fact might signal a near turning point in the business cycle. In sum, a visual inspection of the series gives little support for a break in the historical relations between money, credit and real activity. The recent movements in growth rates are in line with previously observed patterns. While most credit series seem to lag the evolution of real activity, some monetary aggregates, M1 and M2 NFE, indicated in advance the collapse of real activity. The latest development of these series might indicate a turning point in the business cycle.³

³Of course, M1 and M2 NFE are just some indicators out of many that one should consider for

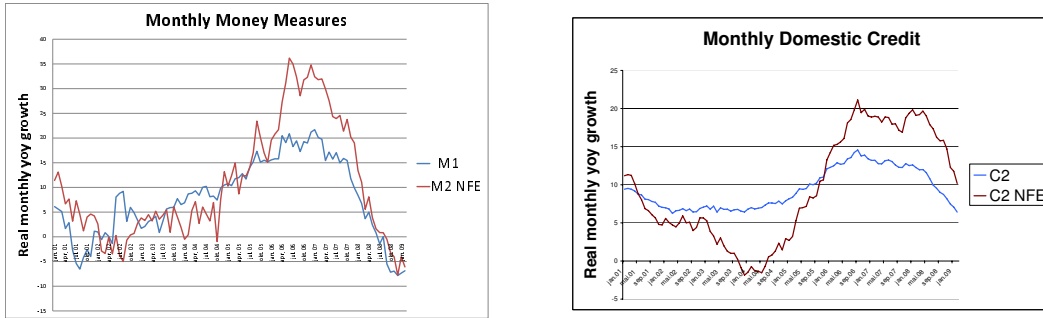


Figure 5: Money and Credit Aggregates - Monthly Data

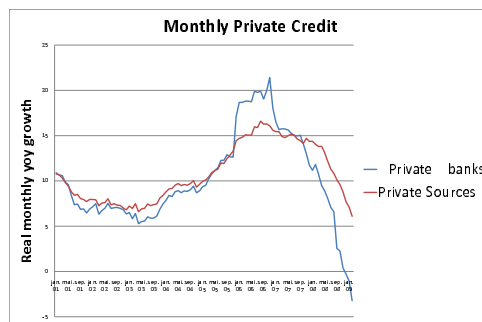


Figure 6: Domestic Credit Sources - Monthly Data

4 Monetary Series as Indicators for Real Activity

This section presents econometric models to forecast yoy growth in YMN using the monetary series M1 and M2 NFE as indicators. These series behave very similarly as we have seen above. What are the reasons for the leading nature of these series? First, there are numerous studies on M1 (or money in general) and its role as a leading indicator for real activity. These papers include studies on the major economies such as the US, Germany et cetera affirming usually a useful role for M1 as a leading indicator. Additionally, real M1 growth is used by the ECB as a leading indicator for GDP growth, M2 growth is used by the Fed and monetary aggregates are part of the Main Leading Economic Indicators of the OECD. One economic interpretation is that M1 (or a similar narrow money measure) is simply an indicator of actual monetary policy. We can think of further reasons for the leading role of money holdings by recalling the standard demand function for real money, $M/P=L(y,i)$. Real money growth might reflect expectations about the quantity of future transactions. Thus, it might capture private sector expectations about future GDP growth.

To assess the potentially leading role of these monetary aggregates we use them in forecasting GDP growth. E.g. exports and imports might give very different signals.

different VARs together with GDP growth and evaluate the coefficients as well as the resulting forecasts. For the coefficients, we show below the equation for real GDP Mainland Norway growth ($\Delta_4 y_t$) of a VAR in yoy growth rates, $(\Delta_4 y_t, \Delta_4 M1_t, \Delta_4 M2NFE_t)$, after restricting the VAR according to the AIC criterion. The equation is

$$\begin{aligned} \Delta_4 y_t = & 0.67 + 0.56\Delta_4 y_{t-1} + 0.29\Delta_4 y_{t-2} - 0.24\Delta_4 y_{t-4} \\ & + \underset{(4.72)}{0.1} \Delta_4 M1_{t-1} - \underset{(-2.61)}{0.11} \Delta_4 M1_{t-3} \\ & + \underset{(3.2)}{0.1} \Delta_4 M2NFE_{t-3} - \underset{(-2.1)}{0.05} \Delta_4 M2NFE_{t-4}. \end{aligned}$$

The t -values for the coefficients on past growth in money are given in parenthesis. As one can see, both variables have a significant impact on GDP growth. An impulse response analysis of the model indicates that both monetary aggregates indeed lead movements in GDP growth.

Furthermore, I evaluate bivariate VARs using only M1 ($\Delta_4 y_t, \Delta_4 M1_t$) or M2 NFE ($\Delta_4 y_t, \Delta_4 M2NFE_t$). Table 1 below compares the forecast performance of the VAR models with a simple autoregressive model (AR(4)) which uses only past GDP growth as a predictor variable:

	Forecast Horizon:			
	h=1	h=2	h=3	h=4
AR(4)	1.0880	2.9059	4.8763	6.6468
VAR (y M1)	0.4005	1.0019	1.9910	3.5487
VAR (y M2NFE)	0.5127	1.0783	1.9432	3.7074
VAR (y M1 M2NFE)	0.3145	0.4834	0.7956	1.8696

Table 1: Forecast Performance in Terms of Mean Squared Error

The forecasts errors have been computed over the last 20 available observations of GDP growth. Thus, the empirical results have to be taken with some caution. Leaving that issue aside, the results confirm our previous analysis: Monetary aggregates can be useful for forecasting GDP growth. Compared to the simpler autoregressive model, AR(4), forecast mean squared errors can be reduced by a substantial amount even for the 4-quarter-ahead forecasts. The most successful model is the trivariate VAR which includes both monetary series.

The resulting forecasts in percentage points for 2009 Q2 to 2010 Q1 can be seen in Table 2. The results indicate that we should expect negative yoy growth for the next two quarters. The predictions differ most for 2010 Q1. The previously most successful model indicates that GDP growth might reach nearly 2% while the other models produce less optimistic predictions.

Finally, Figure 7 shows the forecast performance of the three models together with the latest forecast path.

	Forecast Horizon:			
	2009 Q2	2009 Q3	2009 Q4	2010 Q1
AR(4)	-1.2306	-0.7872	0.0996	1.2548
VAR (y M1)	-1.6630	-1.7651	-1.0248	0.1114
VAR (y M2NFE)	-1.1644	-1.0651	-0.2169	0.9394
VAR (y M1 M2NFE)	-1.1659	-1.1419	0.7744	1.9813

Table 2: Forecasts for yoy growth of real GDP Mainland Norway (percentage points).

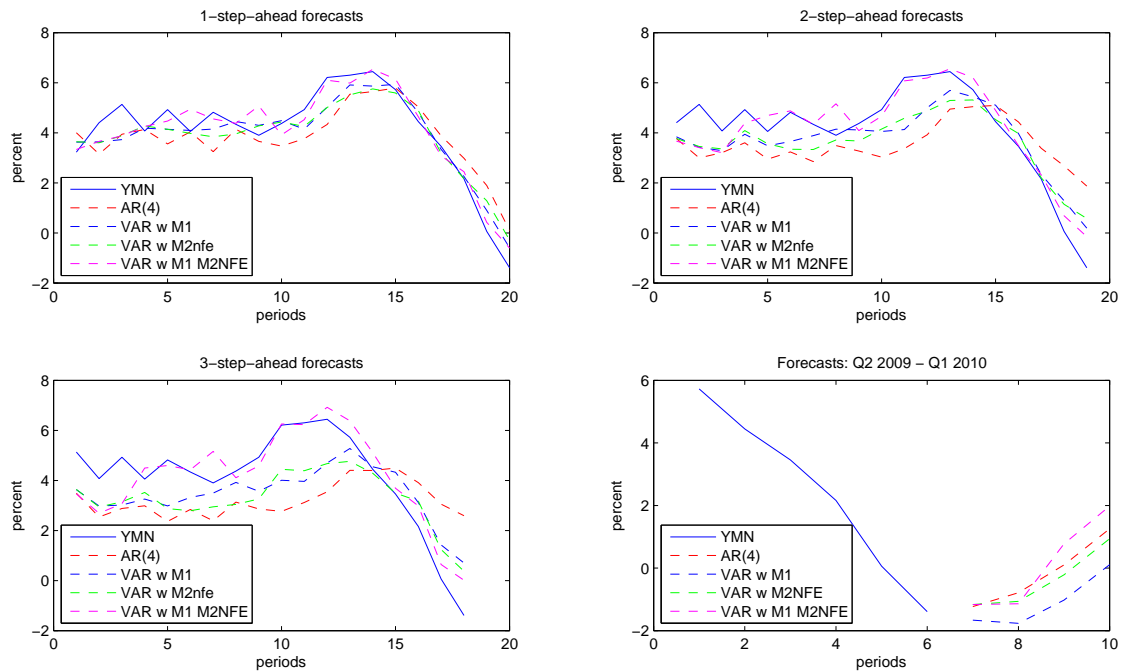


Figure 7: Forecast paths for real GDP Mainland Norway

5 Summary

In this note, I use different historical money and credit series in order to investigate whether worsening credit market conditions are of particular concern in the current recession. A visual inspection of the series gives little support for a break in the historical relations between money, credit and real activity. The recent movements in growth rates are in line with previously observed patterns. Therefore, there is little empirical support for a credit crisis based on our data. Additionally, two monetary disaggregate series, M1 and M2 held by non-financial enterprises, are identified as leading indicators for real economic activity.