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Conference Paper

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Liquidity in the Liquidity Crisis: Evidence from Divisia Monetary Aggregates in Germany and the European Crisis Countries

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Abstract

While there has been some debate over the usefulness of monetary aggregates, there has been surprisingly little discussion of the actual implications for liquidity. In this paper, we provide an approximation of the liquidity development in six Euro area countries from 2003 to 2012. We show that properly measured monetary aggregates contain significant information about liquidity risk.

Keywords: European debt crisis, Divisia aggregation, Liquidity aggregates, Signaling models, Index Number Theory

1. Introduction

Triggered by the US real estate crisis and the subsequent global financial crisis, the fiscal debt situation became critical in a number of Euro area countries, namely Greece, Ireland, Italy, Portugal and Spain. Since domestic government debt played an important role in the portfolios of most European banks,the banking system, which had not yet recovered from the financial crisis, liquidity provision by the banking sector in these countries was undeniably hampered by the outbreak of the European debt crisis. At least in parts of the Euro area, the debt crisis coincides with a liquidity crisis.

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While there has been some debate over the usefulness monetary aggregates, there has been surprisingly little discussion their implications for liquidity. Since interest bearing assets usually provide substantially less liquidity than cash, the simple sum of the value of monetary assets provides, at best, an inferior approximation of liquidity (see, e.g., Barnett, 1980, Kelly et al., 2011 and Barnett and Chauvet, 2011). Especially in times such as the crisis, when interest rates and the composition of money are highly heterogeneous.

In this paper, we provide an approximation of the liquidity development in six Euro area countries from 2003 to 2012 using Divisia aggregation, as proposed in the monetary aggregation literature. Our sample consists of Germany - which is the by far most stable country in Europe - and the aforementioned crisis countries. We are able to show that simple sum money understates the growth of liquidity in Germany, while overstating the liquidity changes in most crisis countries, giving more substance to the liquidity crisis argument that has been brought forward concerning the Euro area periphery.

2. Construction of Divisia Aggregates

2.1. Data

For our analysis, we break M3 down to the seven components defined by the ECB: currency in circulation, overnight deposits, deposits with an agreed maturity of up to two years, deposits redeemable at notice up to three months, repurchase agreements, money market funds and bank debt securities of a maturity up to two years. We use monthly data from January 2003 to March 2012. The quantity data used, with the exception of cash, is available through EuroStat. Currency in circulation can only be proxied on the country level, since currency flows freely within the Euro area. For our analysis, we use currency put into circulation as reported by the IMF. However, the stock values in Portugal become slightly negative for the last few months of our sample due to seasonal adjustment. We treat those values as zero.

We seasonally adjust all quantity data used. In some rare cases, this causes negative stocks for deposits redeemable at notice. These make up a substantial share of money in the initial phase of our sample, but diminish to essentially zero over time. Thus, when our seasonal adjustment causes negative values, we treat those negative values as zeros. Since this only

happens once the asset became virtually irrelevant, this causes only limited effects. Missing observations are replaced by a linear interpolation, where necessary.

It is also necessary to measure the rate of return yielded by each asset class. Interest rate data is available for most countries, but there are time-country-asset observations that were unavailable. Table 1 summarizes how interest rate data was collected and how, when necessary, it was proxied.

2.2. Divisia aggregation

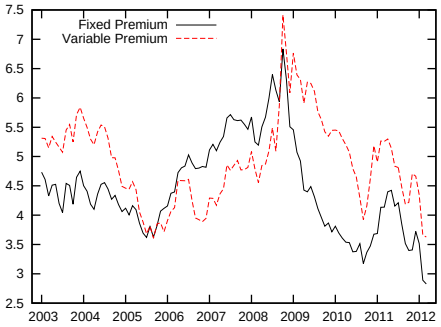
In monetary aggregation theory, the benchmark asset is defined as a pure investment asset that provides no monetary service. Unfortunately, such a benchmark asset is not available in practice. Thus, an important step in constructing a monetary aggregate is to choose a proxy for the rate of return on the benchmark asset (R). We will examine two possible proxies for the the benchmark rate. The first is current standard in the literature. We propose the other to deal with the volatile financial environment during the crisis. Figure 1 plots each benchmark rate.

Upper envelope curve plus constant liquidity premium The first benchmark rate (R_1) is calculated as the maximum of a portfolio of interest rates, which is referred to in the literature as the "upper envelope curve," plus a 100 basis point liquidity premium. The portfolio of interest rates for R_1 includes the interest yielded by the monetary assets included in the aggregate. This method is referred by Anderson and Jones (2011) as their preferred benchmark rate and is similar to the method used by Stracca (2004).

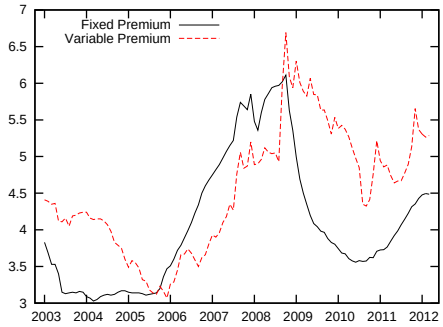
Upper envelope curve plus variable liquidity premium The second benchmark rate (R_2) is calculated by adding a variable liquidity premium to the upper envelope curve of returns on monetary assets. We set the variable liquidity premium to be the spread between the ten year government bonds and one year government bonds. Similar to a fixed liquidity premium, this precludes the possibility that the yield on a monetary asset exceeds the benchmark rate, while allowing for more dynamics in the behavior of liquidity provision.

Table 1: Explanation of Rate of Return on Asset Classes

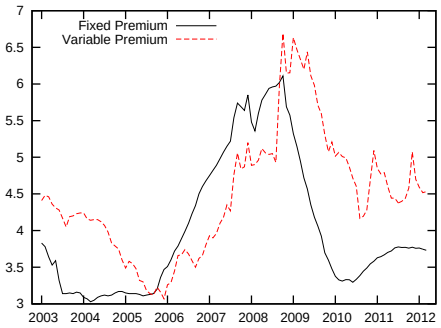
Asset	Interest Rate	Notes
Currency in circulation	Currency is assumed to yield no interest	
Overnight deposits Deposits with maturity less than two years	Interest rate differs for private households and non financial firms. Where possible, we use the quantity share weighted average of the two interest rates.	Separate quantity data is not available for Italy and Portugal. In these cases, we use an unweighted average.
Deposits redeemable at notice	Because interest rates on deposits redeemable at notice are only available for the complete sample in Italy and Germany, we use the interest rate on overnight deposits as a proxy.	For all countries other than Italy and Germany, the importance of deposits redeemable at notice has diminished to near insignificance
Repurchase agreements	The repurchase agreements rate is available for all countries except Ireland and Portugal where repurchase agreements have a small quantity share.	In Ireland and Portugal we use the money market fund rate as a proxy.
Money market funds	Money market rates are only available for Europe as a whole rather than by country, thus we use the Euro interbank overnight rate (EURIBOR).	
Bank debt (maturity less than two years)	Interest rate data on bank debt securities by each country is not available, but data on bank debt in the Euro area is available by rating.	To proxy country level bank debt rates, we use bank debt rate associated with the credit rating of the country (Based on the sovereign rating history of Fitch IBCA).



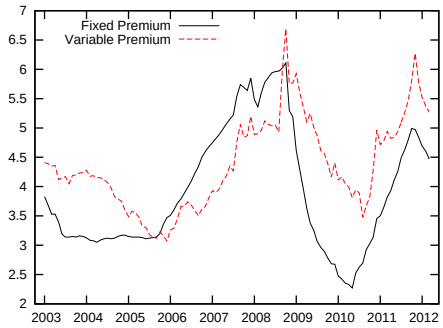
(a) Germany



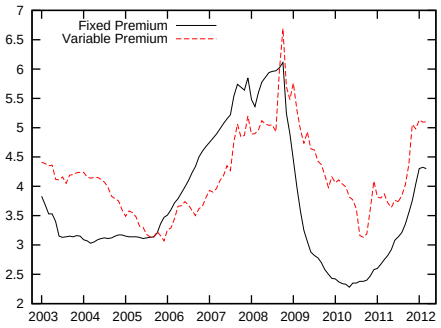
(b) Ireland



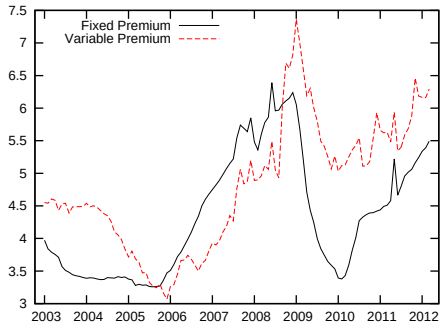
(c) Spain



(d) Portugal



(e) Italy



(f) Greece

Figure 1: Benchmark Rates

3. Cross Country Comparisons

For all countries that are considered in our sample, the story told by the simple sum and both Divisia specification is essentially identical until the end of 2007. Money is increasing steadily. Even in Portugal, the only country where money growth is somewhat volatile before the crisis, the dynamics captured by simple sum and Divisia are almost the same. However, from 2007 on (in Ireland starting mid 2006) Divisia and simple sum money start to diverge strongly. In the crisis countries, both Divisa aggregates indicate a much stronger decline in liquidity than simple sum does. Contrarily, in Germany - our only stable country - simple sum understates liquidity growth.

4. Financial Crisis Signaling

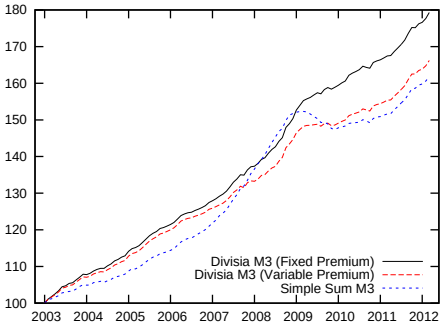
Qualitatively, the Divisia monetary aggregates, regardless of benchmark rate chosen, behave quite differently from the official simple sum measure of M3. However in order to determine if this difference represents valuable information, we use each aggregate in a nonparametric signaling model introduced by Kaminsky and Reinhart (1999). For a detailed survey of Early-Warning Systems literature, see Abiad (2003).

Recent papers, e.g. Alessi and Detken (2011), maximize an objective function that accounts for the trade off between Type-I and Type-II error.[1] We follow the same methodology as Knedlik and von Schweinitz (2012) who study the European sovereign debt crisis. Table 2 reports utility scores of Divisia (R_1), Divisia (R_2) and simple sum monetary aggregates we calculate, as well as the scores of a selection of indicator variables examined by Knedlik and von Schweinitz.

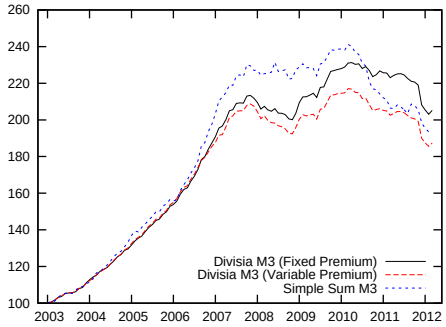
5. Conclusion

Compared to a range of indicators used to predict the debt crises proposed by Knedlik and von Schweinitz (2012), all our monetary aggregates (in year-over-year growth rates) perform very well. In particular, our newly developed Divisia aggregate is only outperformed by government deficit itself in predicting debt crises, and significantly beats the predictive performance of simple sum (according to a bootstrap exercise).

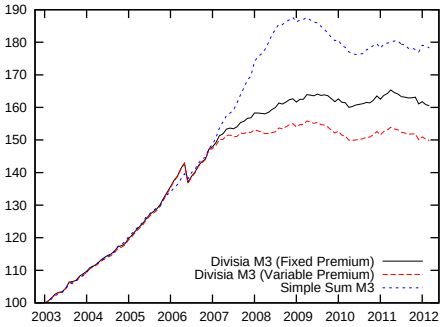
[1] For a more detailed technical description of the methodology see e.g. El-Shagi et al. (2012).



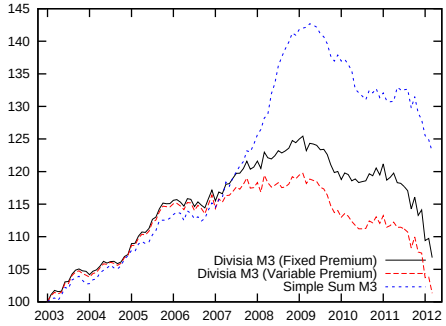
(a) Germany



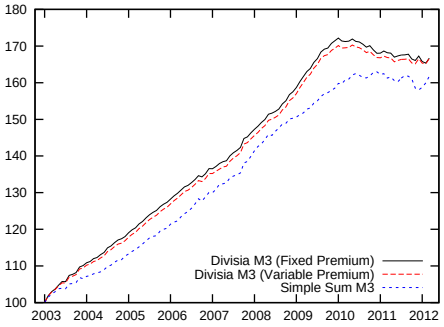
(b) Ireland



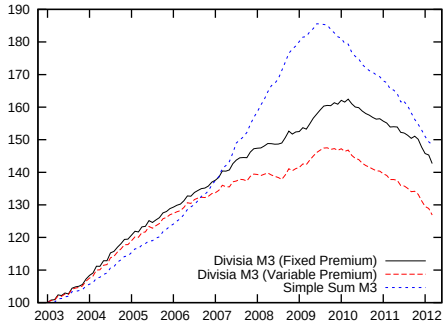
(c) Spain



(d) Portugal



(e) Italy



(f) Greece

Figure 2: Monetary Aggregates

Table 2: Utility score from signaling model using various indicators

Indicator[a]	**Utility Score**[b]
Government Deficit*	0.36
Divisia $(R_2)^\dagger$	**0.30**
Unemployment rate	0.29
Divisia $(R_1)^\dagger$	**0.28**
Labor Force Participation†	0.25
Household Debt*	0.25
Simple Sum M3†	**0.24**
Non-MFI Debt*	0.22
Private Debt*	0.21
Government Debt*	0.16

* and † indicates that the signal variable was a ratio to GDP and year over year growth rate, respectfully.

[a] Results from Knedlik and von Schweinitz (2012) repeated here for comparison.

[b] Utility scores range from -0.5 to 0.5 and larger values indicate better proformance.

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