Multilateral Divisia Monetary Aggregation for the EU and EMU.

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Neepa Gaekwad-Babulal and William A. Barnett, "Multilateral Divisia Monetary Aggregation for the EU and EMU." (July 24, 2015).  
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Multilateral Divisia Monetary Aggregation for EU and EMU

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Society for Economic Measurement Conference 2015
Outline

1. Motivation
2. Our Results/Contribution
3. Summary
“Two-pillar strategy” of ECB.

Barnett (1980)

“by equally weighting components, aggregation by summation can badly distort an aggregate. For example, if one wished to obtain an aggregate of transportation vehicles, one would never aggregate by summation over the physical units of, say, subway trains and roller skates.” Barnett, Edward Offenbacher and Paul Spindt (1984).
The conception of European Union has brought to the fore the question, how to measure monetary services flow aggregates over the proposed area.

Two Approaches

- Direct Approach
- Indirect Approach
In this effort European Central Bank working paper Barnett (2003) for the first time extended the theory on Divisia monetary aggregation to multicountry case in a form applicable to Euro area and provides theory for monetary services aggregation at different levels of integration of Euro area.
Aggregation within Euro area countries

\[ d\log \Pi_k = \sum_{(j,i) \in S_k} w_{kji} d\log \pi_{kji}. \]
\[ d\log M_k = \sum_{(j,i) \in S_k} w_{kji} d\log m_{kji}. \]
\[ w_{kji} = \frac{(R_k - r_{kji}) m_{kji}}{\sum_{(i,j) \in S_k} (R_k - r_{kji}) m_{kji}} \text{ are shares} \]
\[ \pi_{kji}^* = R_k - r_{kji} \text{ is the real user cost price of asset } i \text{ located in country } j \text{ owned by resident of country } k \]

The following nominal to real values are proved to be related

\[ \pi_{kji} = p_k^* \pi_{kji}^* , \ M_k = M_k^* p_k^* , \ \Pi_k = \Pi_k^* p_k^* \]
The expected rate of return received on a pure investment providing no services other than its yield.

It must be at least as high as the upper envelope over all the monetary aggregate’s component yield curve adjusted rates of return.

We have included the short term loan rate upto one year maturity within the computation of the upper envelope. Barnett, Liu, Mattson and van der Noort (2013).
Aggregation over Euro area countries.

\[ d \log M = \sum_{k=1}^{K} W_k d \log (s_k M_k e_k) \]
\[ d \log \Pi = \sum_{k=1}^{K} W_k d \log (\Pi_k e_k) \]
\[ W_k = \frac{M_k^* \Pi_k e_k s_k}{\sum_{k=1}^{K} M_k^* \Pi_k e_k s_k} \]

is the \( k \)th country’s expenditure share of total union’s monetary services

\[ s_k = \frac{H_k}{\sum_{k=1}^{K} H_k} \]

is country \( k \)’s fraction of total union’s area population

The following nominal to real values are proved to be related

\[ M = M^* p^*, \quad \Pi = \Pi^* p^* \]
Data

Data source is both the ECB and the Central banks of the EU countries.
### Divisia Aggregate

<table>
<thead>
<tr>
<th>Divisia Aggregate</th>
<th>Countries included</th>
</tr>
</thead>
<tbody>
<tr>
<td>EMU-16 Divisia M1</td>
<td>Austria, Belgium, Estonia, Finland, France, Germany,</td>
</tr>
<tr>
<td></td>
<td>Greece, Ireland, Italy, Luxembourg, Malta, Netherlands,</td>
</tr>
<tr>
<td>EMU-16 Divisia M2</td>
<td>Portugal, Slovakia, Slovenia, Spain</td>
</tr>
<tr>
<td>EMU-11 Divisia M2</td>
<td>Estonia, Finland, France, Germany, Ireland, Italy,</td>
</tr>
<tr>
<td></td>
<td>Luxembourg, Malta, Netherlands, Slovakia, Slovenia</td>
</tr>
</tbody>
</table>
### European Union

<table>
<thead>
<tr>
<th>Divisia Aggregate</th>
<th>Countries included</th>
</tr>
</thead>
<tbody>
<tr>
<td>EU-24 Divisia M1</td>
<td>Austria, Belgium, Bulgaria, Czech Republic, Denmark, Estonia,</td>
</tr>
<tr>
<td>EU-24 Divisia M2</td>
<td>Finland, France, Germany, Greece, Hungary, Ireland, Italy,</td>
</tr>
<tr>
<td></td>
<td>Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal,</td>
</tr>
<tr>
<td>EU-18 Divisia M2</td>
<td>Slovakia, Slovenia, Spain, Sweden, UK</td>
</tr>
</tbody>
</table>

Barnett, Gaekwad-Babulal  
Multilateral Divisia Monetary Aggregation for EU and EMU
Divisia M1 Aggregate

- Currency in circulation
- Overnight deposits - are deposits with next day maturity, comprises of sight/demand deposits which are fully transferable by cheque or similar instrument
- EMU-16 Divisia M1 and EU-24 Divisia M1 index aggregates currency in circulation and overnight deposits.
EMU-16 Divisia M1

EMU-16 HH M1

Graph showing the trend of EMU-16 Divisia M1 from January 2003 to July 2013.
EMU-16 Divisia M1 (year-over-year % change)
EU-24 Divisia M1
EU-24 Divisia M1 (year-over-year % change)
Euro area M2 aggregate

Euro area M2 aggregate consists of components of M1 and Deposits with agreed maturity up to 2 years (DAM) and Deposits redeemable at notice up to 3 months (DRN)
Euro area Divisia M2 aggregate

- It includes currency in circulation, overnight deposits and Deposits of Agreed maturity up to 2 years (DAM)
- DAM are mainly time deposits with a maturity within 2 years and may be subject to payment of penalty in the event of early withdrawal.
EU-24 Divisia M2

[Line graph showing EU-24 HH M2 from Jan-04 to Jul-13]
EU-24 Divisia M2 (year-over-year % change)
EMU-11 Divisia M2 and EU-18 Divisia M2

- Include smaller number of countries but includes an additional monetary service, deposits redeemable at notice up to 3 months (DRN)
- It includes currency in circulation, overnight deposits, DAM and DRN.
- DRN are mainly savings deposits for which a holder must respect a fixed period of notice before withdrawing the funds.
EMU-10 Divisia M2
EMU-11 Divisia M2 (year-over-year % change)
EU-18 Divisia M2
EU-18 Divisia M2 (year-over-year % change)
Comparing the Divisia and simple sum aggregate for EU-18 M2 (year-over-year % change)
The Divisia indices show a dip in the recession period.
These indices have a great potential to be broader monetary aggregates.