Cash Holdings in Germany and the Demand for "German" Banknotes:
What role for cashless payments?

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"...the demand for currency may have properties nothing like what one would expect from textbook models of money demand."

(S. Sumner, 1994)
1. Some (stylized?) facts
German banknotes in circulation (€ bn)
Cash holdings in Germany and the demand for German banknotes

EMU: Total cash in circulation

- Cumulated net issues: Eurosystem
- Cumulated net issues: Germany
- Annual growth rate (%): Eurosystem
- Annual growth rate (%): Germany
Cash holdings in Germany and the demand for German banknotes

**Banknotes: (Net) issue shares**

![Bar chart showing cash holdings by denomination in Germany and the Euro area excluding Germany.](chart)

- **Germany**
- **Euro area w/o Germany**

<table>
<thead>
<tr>
<th>Denomination</th>
<th>Germany Share</th>
<th>Euro area w/o Germany Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>EUR 500</td>
<td>60%</td>
<td>40%</td>
</tr>
<tr>
<td>EUR 200</td>
<td>50%</td>
<td>50%</td>
</tr>
<tr>
<td>EUR 100</td>
<td>40%</td>
<td>60%</td>
</tr>
<tr>
<td>EUR 50</td>
<td>30%</td>
<td>70%</td>
</tr>
<tr>
<td>EUR 20</td>
<td>20%</td>
<td>80%</td>
</tr>
<tr>
<td>EUR 10</td>
<td>10%</td>
<td>90%</td>
</tr>
<tr>
<td>EUR 5</td>
<td>0%</td>
<td>100%</td>
</tr>
</tbody>
</table>
Card payments per capita and year

transactions per capita and year

2002

2014

0

50

100

150

200

250

300

Greece
Czech Republic
Hungary
Poland
Slovakia
Italy
Lithuania
Malta
Germany
Cyprus
Latvia
Spain
Austria
Slovenia
Euro area total
EU total
Ireland
Belgium
Portugal
France
Estonia
Luxembourg
Netherlands
United Kingdom
Finland
Denmark
Sweden

49

40

80

93
Cash holdings in Germany and the demand for German banknotes

Cards and cash at the POS (share in retail turnover)
Cash holdings in Germany and the demand for German banknotes

GE: Cash demand motives

- 45% outside euro area
- 25% other euro area countries
- 20% hoarding
- 10% transaction balances
2. The model: data, specification, results
Why cash?

- Transaction demand,
- Hoarding, store of wealth
- Shadow economy,
- *Alternative payment media*, especially cards,
- Foreign demand
Cash holdings in Germany and the demand for German banknotes

Data

- Sample 2002 - 2011
- Quarterly data
- Specification in real terms
- Denominational split:
  - small (€5 - €20)
  - medium (€50 - €100)
  - large (€200 - €500)
Cash holdings in Germany and the demand for German banknotes

Small, medium and large value denominations, in real terms (€ bn)
Econometric model

- Cointegration framework
  - VECM for small and large
  - DOLS for medium
  - Unit root testing, lag order selection
  - Small-sample adjustment of test statistics
  - Exogenous (non-modelled) variables
  - Number of cointegration relationships (1)
  - Weak exogeniety
### Results

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
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<tbody>
<tr>
<td><strong>Long-term</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>cc</td>
<td>8.9 (20.2)</td>
<td>2.8 (3.2)</td>
<td></td>
</tr>
<tr>
<td>eeff</td>
<td>3.1 (15.0)</td>
<td></td>
<td>2.0 (10.7)</td>
</tr>
<tr>
<td>i</td>
<td></td>
<td>-0.09 (8.8)</td>
<td></td>
</tr>
<tr>
<td>house</td>
<td></td>
<td>0.8 (7.9)</td>
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<tr>
<td>pc_remu</td>
<td></td>
<td>5.0 (11.4)</td>
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<td><strong>Short-term (exogenous)</strong></td>
<td></td>
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<tr>
<td>ect</td>
<td>-0.17 (-3.9)</td>
<td>-0.19 (0.02)</td>
<td>-0.48 (-5.0)</td>
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<tr>
<td>cards</td>
<td>-0.2 (-1.7)</td>
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<tr>
<td>d(pc_remu)</td>
<td>0.004 (4.5)</td>
<td>0.22 (0.02)</td>
<td>0.01 (0.01)</td>
</tr>
<tr>
<td>i</td>
<td></td>
<td>-0.03 (-2.7)</td>
<td></td>
</tr>
<tr>
<td>d(un)</td>
<td></td>
<td>1.0 (3.4)</td>
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<tr>
<td>d2008q4</td>
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<td>0.09 (0.03)</td>
<td>0.1 (2.5)</td>
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<td>d_debt2010q1</td>
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<td></td>
<td>0.03 (1.6)</td>
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<tr>
<td>d_2007q4</td>
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<td>-0.1 (-1.7)</td>
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</tr>
</tbody>
</table>

**Diagnostics**

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<tbody>
<tr>
<td>adj. R²</td>
<td>0.73</td>
<td>0.99</td>
<td>0.61</td>
</tr>
<tr>
<td>s.e.</td>
<td>0.02</td>
<td>0.03</td>
<td>0.04</td>
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<tr>
<td>F stat.</td>
<td>19.0</td>
<td>-</td>
<td>9.8</td>
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<tr>
<td>LM(1)</td>
<td>0.02</td>
<td>-</td>
<td>0.16</td>
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<tr>
<td>LM(4)</td>
<td>0.88</td>
<td>-</td>
<td>0.21</td>
</tr>
<tr>
<td>Hansen</td>
<td></td>
<td>&gt;0.2</td>
<td></td>
</tr>
<tr>
<td>Normality</td>
<td>0.98</td>
<td>0.78</td>
<td>0.00</td>
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</table>
Cointegration relation for small
Cash holdings in Germany and the demand for German banknotes

Volume of card payments in Germany (€ bn)

![Graph showing the volume of card payments in Germany from 2002 to 2013. The graph compares the volume of card payments for Bundesbank and PaySys, with a steady increase over the years.]
Summary, conclusion

- Dynamics of euro notes are, to a large extent, driven by demand from outside the euro area and this demand is predominantly met by Germany.

- Importance: distinguishing different motives of holding cash.
  - Diminishing role of transactions motive
  - Increasing role of other motives

- Influence of cards limited to small denominations. Reasons: dominance of other factors, especially foreign demand, poor data quality and small sample.
Thank you very much for your attention!

Any questions?