Responding to a Shadow Banking Crisis: the Lessons of 1763

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Presented in Honor of Warren Weber
February 18, 2012
Motivation

To better identify the persistent properties of shadow bank instability.
Method

To reconstruct a historical episode that is similar to, but not identical to the recent crisis.
## Similarities

<table>
<thead>
<tr>
<th>Feature</th>
<th>1763</th>
<th>2007-8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Securitization</td>
<td>Bill of exchange</td>
<td>Many (ABCP)</td>
</tr>
<tr>
<td>Shocking failure</td>
<td>Neufville</td>
<td>Lehman</td>
</tr>
<tr>
<td>Rollover crisis?</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Central bank</td>
<td>Bank of Amsterdam</td>
<td>Federal Reserve</td>
</tr>
<tr>
<td>CB Lender to guarantors?</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>CB Emergency facilities?</td>
<td>Bullion</td>
<td>Numerous</td>
</tr>
</tbody>
</table>
## Differences

<table>
<thead>
<tr>
<th></th>
<th>1763</th>
<th>2007-8</th>
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</thead>
<tbody>
<tr>
<td><strong>Regulation</strong></td>
<td>Settlement</td>
<td>Prudential</td>
</tr>
<tr>
<td><strong>Bailouts</strong></td>
<td>None</td>
<td>Too big to fail</td>
</tr>
<tr>
<td><strong>International liquidity</strong></td>
<td>None</td>
<td>Currency swaps</td>
</tr>
<tr>
<td><strong>Open Market Operations</strong></td>
<td>None</td>
<td>Quantitative Easing</td>
</tr>
</tbody>
</table>
Outline

1. Shadow Banking
2. Data
3. Shock
4. Run and Response
Table 1: stylized ABCP conduit

Period 0:  (a) $D$ creates and sells an ASSET to $B$
           (b) $B$ creates and sells ABCP1 to $C1$

Period 1:  (a) $B$ creates and sells ABCP2 to $C2$
           (b) $B$ repays $C1$ for ABCP1

Period 2:  (a) $D$ repays $B$ for ASSET
           (b) $B$ repays $C2$ for APCP2
Shadow Run

Period 0:  (a) $D$ creates and sells an ASSET to $B$
            (b) $B$ creates and sells ABCP1 to $C1$

Period 1:  (a) $B$ creates and sells ABCP2 to $C2$
            (b) $B$ repays $C1$ for ABCP1

Period 2:  (a) $D$ repays $B$ for ASSET
            (b) $B$ repays $C2$ for APCP2
### Table 2: stylized acceptance loan, 1763

<table>
<thead>
<tr>
<th>In Hamburg</th>
<th>In Amsterdam</th>
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**Period 0:**
(a) $D$ draws BILL1 on $B$
(b) $D$ sells it to $C1$
Table 2: stylized acceptance loan, 1763

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<td><strong>Period 0:</strong></td>
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<td>$C1$ travels to Amsterdam</td>
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<tr>
<td>(b) $D$ sells it to $C_1$</td>
<td></td>
</tr>
<tr>
<td>$C_1$ travels to Amsterdam</td>
<td></td>
</tr>
<tr>
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<td></td>
</tr>
<tr>
<td>(a) $B$ accepts BILL1</td>
<td></td>
</tr>
<tr>
<td>(b) $B$ draws BILL2 on $D$</td>
<td></td>
</tr>
<tr>
<td>(c) $B$ sells BILL2 to $C_2$</td>
<td></td>
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</tbody>
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<td></td>
</tr>
<tr>
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<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>$C_2$ travels to Hamburg</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Period 2:</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>(a)</td>
<td>$D$ accepts BILL2</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Period 3:</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>(a)</td>
<td>$D$ settles BILL2 with $C_2$</td>
<td></td>
</tr>
</tbody>
</table>
Numerical Example

Period 0

• $C_1$ gives 100 Hamburg thalers for BILL1.
• BILL1 obliges $B$ to pay 165 bank guilders in two months at the Bank of Amsterdam. The exchange rate is 1.65:1.

Period 1

• $B$ sells BILL2 to $C_2$ for 166 bank guilders. 165 will settle BILL1 and 1 is a service fee.
• BILL2 obliges $D$ to pay 101.8 thalers in Hamburg in two months. The exchange rate is 1.63:1.

Period 3

• $D$ pays an annualized 4-month rate of 5.4 percent
Phase 1: Rollover Crisis

In Hamburg

Period 0:  (a)  $D$ draws BILL1 on $B$
(b)  $D$ sells it to $C1$

$C1$ travels to Amsterdam

Period 1:  (a)  $B$ accepts BILL1
(b)  $B$ draws BILL2 on $D$
(c)  $B$ sells BILL2 to $C2$

$C2$ travels to Hamburg

Period 2:  (a)  $D$ accepts BILL2
(b)  $B$ settles BILL1 with $C1$

Period 3:  (a)  $D$ settles BILL2 with $C2$
Phase 2: Acceptance Collapse

In Hamburg

Period 0:  
(a)  $D$ draws BILL1 on $B$
(b)  $D$ sells it to $C1$
$C1$ travels to Amsterdam

Period 1:  
(a)  $B$ accepts BILL1
(b)  $B$ draws BILL2 on $D$
(c)  $B$ sells BILL2 to $C2$
$C2$ travels to Hamburg

Period 2:  
(a)  $D$ accepts BILL2
(b)  $B$ settles BILL1 with $C1$

Period 3:  
(a)  $D$ settles BILL2 with $C2$
Phase 3: Securitization Collapse

In Hamburg

Period 0:  
(a) $D$ draws BILL1 on $B$
(b) $D$ sells it to $C_1$
$C_1$ travels to Amsterdam

Period 1:  
(a) $B$ accepts BILL1
(b) $B$ draws BILL2 on $D$
(c) $B$ sells BILL2 to $C_2$
$C_2$ travels to Hamburg

Period 2:  
(a) $D$ accepts BILL2
(b) $B$ settles BILL1 with $C_1$

Period 3:  
(a) $D$ settles BILL2 with $C_2$
Outline

1. Shadow Banking
2. Data
3. Shock
4. Run and Response
Recorded at the Bank of Amsterdam?

In Hamburg

Period 0:  
(a)  $D$ draws BILL1 on $B$
(b)  $D$ sells it to $C1$
$C1$ travels to Amsterdam

Period 1:  
(a)  $B$ accepts BILL1
(b)  $B$ draws BILL2 on $D$
(c)  $B$ sells BILL2 to $C2$
$C2$ travels to Hamburg

In Amsterdam

Period 2:  
(a)  $D$ accepts BILL2

Period 3:  
(a)  $D$ settles BILL2 with $C2$
# Bank of Amsterdam Balance Sheet

August 1, 1763, in bank guilders

<table>
<thead>
<tr>
<th>Assets</th>
<th>Liabilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metal</td>
<td>Accounts</td>
</tr>
<tr>
<td>21,895,124</td>
<td>22,660,145</td>
</tr>
<tr>
<td>Under Receipt (&quot;Repo&quot;)</td>
<td></td>
</tr>
<tr>
<td>21,606,690</td>
<td></td>
</tr>
<tr>
<td>Unencumbered</td>
<td></td>
</tr>
<tr>
<td>288,434</td>
<td></td>
</tr>
<tr>
<td>Loans</td>
<td>Capital</td>
</tr>
<tr>
<td>527,264</td>
<td>-237,757</td>
</tr>
<tr>
<td>Total</td>
<td>Total</td>
</tr>
<tr>
<td>22,422,388</td>
<td>22,422,388</td>
</tr>
</tbody>
</table>
Data for 1763

• Weekly gross payments between
  o each of the 8 largest merchant bankers
  o each banker with the rest of the Bank of Amsterdam
  o each with the Bank of Amsterdam’s master account

• Week-start balances of the same.
Data Shows

- New bills financed acceptances before the crisis.
Table 3. Bank of Amsterdam transactions, January-July 1763
Weekly Means in Thousands of Bank Guilders

<table>
<thead>
<tr>
<th>Merchant bank</th>
<th>Starting balance</th>
<th>Total Payments</th>
<th>Payments/Balance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hope &amp; Compagnie</td>
<td>439.3</td>
<td>473.9</td>
<td>1.12</td>
</tr>
<tr>
<td>Andries Pels &amp; Zoonen</td>
<td>359.7</td>
<td>245.8</td>
<td>0.70</td>
</tr>
<tr>
<td>George Clifford &amp; Zoonen</td>
<td>277.1</td>
<td>392.3</td>
<td>1.49</td>
</tr>
<tr>
<td>Gebroeders de Neufville</td>
<td>103.3</td>
<td>241.3</td>
<td>2.69</td>
</tr>
<tr>
<td>Vernede &amp; Compagnie</td>
<td>99.0</td>
<td>179.5</td>
<td>2.75</td>
</tr>
<tr>
<td>Raymond &amp; Theodoor de Smeth</td>
<td>77.7</td>
<td>164.5</td>
<td>2.57</td>
</tr>
<tr>
<td>Horneca Hogguer &amp; Co.</td>
<td>69.7</td>
<td>146.7</td>
<td>2.51</td>
</tr>
<tr>
<td>Charles &amp; Theophilus Cazenove</td>
<td>68.7</td>
<td>227.7</td>
<td>4.25</td>
</tr>
<tr>
<td>Total 8 large banks</td>
<td>1,494.5</td>
<td>2071.7</td>
<td></td>
</tr>
<tr>
<td>(Rest of the Bank accounts)</td>
<td>21,686.0</td>
<td>1925.3¹</td>
<td></td>
</tr>
</tbody>
</table>

¹ Sum of coin withdrawals plus transfers to eight most active accounts.
Data Shows

- New bills financed acceptances before the crisis.

- The failure of Neufville caused a sudden drop in bill creation.

- Liquidity creation prevented additional failures.
Outline

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May 1763

1. decline in commodity prices.
2. demonetization of Prussian coins.

Debtors suddenly lacked means to pay bills.
May 1763

1. decline in commodity prices.
2. demonetization of Prussian coins.

Debtors suddenly lacked means to pay bills.

→ So debtors draw and sell new bills on Amsterdam.
→ Silver bullion follows in hopes of paying the new bills.
Lehman Moment

Aron Joseph fails on July 28.

Neufville’s exposure? 163,000 guilders.
Lehman Moment

Aron Joseph fails on July 28.

Neufville’s exposure? 163,000 guilders.

Neufville’s total assets? 10 million guilders.
Lehman Moment

Aron Joseph fails on July 28.

Neufville’s exposure? 163,000 guilders.

Neufville’s total assets? 10 million guilders.

Neufville’s average weekly funding requirement? 241,000 guilders.
Aron Joseph fails on July 28.

Neufville’s exposure? 163,000 guilders.

Neufville’s total assets? 10 million guilders.

Neufville’s average weekly funding requirement? 241,000 guilders.

Neufville suspends payments on July 30.
Too Big to Fail?

This morning … we received a fatal express, with the terrible news that you, the gentlemen of Amsterdam, would leave the Neufvilles to sink, by which we were all thunderstruck; never dreaming that so many men in their senses in your city could take such a step … which will infallibly plunge all Europe in an abyss of distress, if not remedied by you whilst it is still time.

--- Petition from Hamburg, August 4, 1673

From Tooke (1838, 149-150).
Consequences of Neufville Failure

Direct
Consequences of Neufville Failure

Direct

Indirect

- Scramble for coin
- Run on deposit banks
- Rollover crisis
Rollover Crisis

Payments value by source, 1763:1-1764:1

3-week moving averages. Source: Stadsarchief Amsterdam 5077.
Outline

1. Shadow Banking
2. Data
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Run and Response

Weekly position of Horneca Hogguer

Thousands of Bank Guilders


Balances  CUM Transfers  CUM Coin
Additional Response

- Open Market Operations?
- Ad hoc bullion repo window
  - unlimited amounts
  - low interest rate
  - large haircut
Run and Response

Weekly position of Cazenove

Thousands of Bank Guilders

Balances  CUM Transfers  CUM Coin  CUM Bullion
Run and Response

Weekly position of Smeth

Thousands of Bank Guilders

Balances  CUM Transfers  CUM Coin  CUM Bullion
Non-Bank Response

Weekly cumulative positions for the rest of the Bank

Millions of Bank Guilders

CUM Coin  CUM Bullion

Lessons

1763 confirms that a shadow run is a rollover crisis.
Lessons

1763 confirms that a shadow run is a rollover crisis.

1763 suggests that a smaller scale of central bank response can be sufficient for local effectiveness.
Weekly Central Bank Assets in 1763 and 2008

- AMS: Traditional
- FED: Traditional

Weeks Before and After Major Failure
0=1 August, 1763 and 0=10 September, 2008

Sources: Federal Reserve and Stadsarchief Amsterdam 5077
Weekly Central Bank Assets in 1763 and 2008

Sources: Federal Reserve and Stadsarchief Amsterdam 5077
Weekly Central Bank Assets in 1763 and 2008

Sources: Federal Reserve and Stadsarchief Amsterdam 5077
Questions?
Weekly “funding gap” with non-banks

Millions of Bank Guilders

- Payments from Others to Banks
- Payments from Banks to Others

Net Flow

<table>
<thead>
<tr>
<th>Date</th>
<th>Payments from Others to Banks</th>
<th>Payments from Banks to Others</th>
</tr>
</thead>
<tbody>
<tr>
<td>28-Jan</td>
<td></td>
<td></td>
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<tr>
<td>21-Feb</td>
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<td>21-Mar</td>
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<td>18-Apr</td>
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<td>16-May</td>
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<td>13-Jun</td>
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<td>11-Jul</td>
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<td>8-Aug</td>
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<td>5-Sep</td>
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<td>3-Oct</td>
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<td>31-Oct</td>
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<td>28-Nov</td>
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<td>26-Dec</td>
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</table>
Figure 10: Simulated balances with no bullion window + 2 failures

Horneca, July 1763-January 1764

Hope, July 1763-January 1764
Figure 6: Weekly total banker balances in 1763

with accumulation by channel
Figure C3. Weekly balances of Pels
Figure C4. Weekly balances of Clifford
Figure C6. Weekly balances of Vernede

Thousands of Bank Guilders

- Balances
- CUM Transfers
- CUM Coin
- CUM Bullion
Figure C2. Mint production of silver coins, 174

Source: Derived from Polak 1998.