What are the Implications of the Growing Use of Electronic Trading?

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The Royal Bank of Scotland
Historical Perspective

- The mid to late 1990’s: Single bank platforms, processing efficiency, functionality build out, STP, private networks, RFQ.

- 2000 – 2004: The rise of multi-bank platforms, transition to the internet, the ECN develops, auto pricing is a focus, prime brokerage activity in FX expands, white labeling and outsourcing proliferates, “reported e-ticket volumes in excess of 50% of total” by 2004.

- 2005: The Application Program Interface (API) facilitates revolutionary change in the FX market. Hedge Fund and CTA participation leads to explosive volume increases, programmable, rapid-fire, high frequency trading gains momentum. RFQ-RFS.
Growth in overall FX cash traded volume: 2004-2005
Comparable data from the Federal Reserve, Bank of England and ClientKnowledge

Federal Reserve: 19.7%
ClientKnowledge FX Study: 18.9%
Bank of England: 16.7%

% change in annual FX cash traded volume:

<table>
<thead>
<tr>
<th>CK FX2004-2005 Study</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corporations</td>
<td>-19.3</td>
</tr>
<tr>
<td>Institutional investors overall</td>
<td>23.6</td>
</tr>
<tr>
<td>Real money investors</td>
<td>-55.8</td>
</tr>
<tr>
<td>Leveraged/highly active investi</td>
<td>81.1</td>
</tr>
<tr>
<td>Client banks</td>
<td>2.2</td>
</tr>
</tbody>
</table>
% share of daily FX cash traded volume ~
Global corporations, real money and leveraged/highly active investors: 2004

- Corporations, 24%
- Client banks, 40%
- Real money investors, 15%
- Leveraged/highly active investors, 21%

% share of daily FX cash traded volume ~
Global corporations, real money and leveraged/highly active investors: 2005

- Corporations, 18%
- Client banks, 37%
- Real money investors, 7%
- Leveraged/highly active investors, 38%
Volumes / Client Update

- If EBS / Reuters are included in the % of volumes transacted then e – FX is very high

- Otherwise it is estimated that more than 50% of the client market is now electronic with significant scope for growth

- Single bank platforms are retaining a higher proportion of volumes

- Client knowledge estimates that Algorithmic volumes made up 5 – 7 % of overall volume by mid 2005 and may have doubled since

- Search for Alpha is driving growth from sell-side and buy-side
Client Adoption / Benefits

**FIGURE ONE: ELECTRONIC TRADING ACTIVITY**
FOREIGN EXCHANGE USERS – ELECTRONIC TRADING

<table>
<thead>
<tr>
<th>Current Activity</th>
<th>2004</th>
<th>2003</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage of volume</td>
<td>48%</td>
<td>52%</td>
</tr>
<tr>
<td>43%</td>
<td>57%</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Expected Activity</th>
<th>2004</th>
<th>2003</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage of volume</td>
<td>54%</td>
<td>48%</td>
</tr>
<tr>
<td>49%</td>
<td>51%</td>
<td></td>
</tr>
</tbody>
</table>

Note: based on 628 accounts trading electronically

**FIGURE TWO: PRIMARY BENEFITS OF ONLINE TRADING**
FOREIGN EXCHANGE USERS – ELECTRONIC TRADING – 2005

<table>
<thead>
<tr>
<th>Benefit</th>
<th>2005</th>
<th>2003</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faster executions</td>
<td>65%</td>
<td></td>
</tr>
<tr>
<td>Convenience, efficiency, productivity</td>
<td>59%</td>
<td></td>
</tr>
<tr>
<td>Tight spreads</td>
<td>34%</td>
<td></td>
</tr>
<tr>
<td>Straight-through processing</td>
<td>30%</td>
<td></td>
</tr>
<tr>
<td>Reduction in trade errors</td>
<td>28%</td>
<td></td>
</tr>
<tr>
<td>Increased liquidity in major currencies</td>
<td>12%</td>
<td></td>
</tr>
<tr>
<td>Ability to track trades</td>
<td>12%</td>
<td></td>
</tr>
<tr>
<td>Improved price discovery for fiduciary purposes</td>
<td>9%</td>
<td></td>
</tr>
</tbody>
</table>

Note: based on 628 accounts trading electronically
Present Market Dynamics / Trends

- Further proliferation of retail activity
  - Tapping E-liquidity
  - Regulation an Issue?

- Liquidity Outsourcing, White Labelling, Bank to Bank Marketing on the Rise

- A “Technology Arms Race” has Intensified
  - Bank vs. Bank - product diversification to gain market share
    - e FX Options
    - e FX Fixings
    - Finer Pricing, Additional Decimal Places
    - More Flexible OMS, Stop Loss Orders?
    - e FX Prime Brokerage
    - Algorithmic Trading
  - Bank vs. Clients – Technological Processing Power/Capability can Determine Success
    - Large Investments required especially by the sell-side on capacity of hardware not just on functionality upgrades
Present Market Dynamics / Trends

- **FX Prime Brokerage at the Forefront**
  - Enabling broad access, underpinning the growth in client-side provision of liquidity (Hedge Funds, CTA’s)
  - Driving the increase in anonymous trading and aggregated dealing on dealer prices.
  - Is KYC an issue?

- **Price Latency Issues**
  - Banks must invest, some to withdraw?
  - Value of flows to be measured, tiered pricing to ensue?

- **Convergence of Buy-side and Sell-side**
  - Client-side better able to stream liquidity into the Market
Present Market Dynamics / Trends

- **Algorithmic Trading**
  - Quantitative, typically high frequency automated trading strategy that is implemented without human intervention, Buy-side and Sell-side participation
  - Has roots in the equity markets, FIX language for FX seemingly important
  - Is Buy-side or Sell-side better positioned to succeed in this field? Is the end of human trading in sight, will trader attrition be accelerated?

- **Consolidation in the e-commerce space**
  - Liquidity fragmentation or aggregation?
  - Recent announcements in ECN space
    - Hot spot – Knight, FX All – Private equity, EBS – ICAP?
  - Implications?
    - Multi-asset strategies to include FX e-trading?
    - Is a new inter-bank market set to emerge?
Present Market Dynamics / Trends

- Liquidity Mirage, Liquidity Magnification, Liquidity Hazard

- Price taker has “real liquidity”, market maker inherits a potential “liquidity hazard”
- EBS / Reuters still the main reference points for e-pricing.
  - Not enough sources?
- Buy-side given too many points of access? EBS Prime / Reuters, CME, single and multi-bank platforms, ECN’s etc
- Equity capital at risk
- Market self-policing?, dynamic MIS required to respond
Liquidity Mirage?

Request for quote (RFQ)

Client 1  Client 2  Client 3

RFQ 1  RFQ 2  RFQ 3

Liquidity control at point of quote

Prices as indication via SDP, MPP, exchanges

Bank

Executable streaming price (ESP)

Client 1  Client 2  Client 3

Live prices via SDP, MPP, exchanges

Liquidity control pre-quote

Bank
Implications / Discussion

- As Volumes increase will market risk or operational (technological) risk be more of an issue?
- What will be the future growth areas? Are Emerging Markets gaining traction?
- Sell-side race for market share and buy-side empowerment have fuelled unrestrained liquidity provision. Are we at a turning point?
- Is electronic, commission-based execution appropriate for active large buy-side clients?
- Will regulatory factors affect the development path of e-trading in FX?
- Will integrated multi-asset e-commerce grow in future?
- Is a centralized exchange-based model a foregone conclusion? What are the obstacles?
- Will an unbundling of services occur in the FX Markets?