Market Order Flows, Limit Order Flows and Exchange Rate Dynamics
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Extends the Evans and Lyons (2002) Portfolio Shifts Model to simultaneous trading in a “direct” market and an “indirect” limit order market.

Tests the predictions of the model with 2 years of trading data in GBP/USD, EUR/USD and EUR/GBP from Reuters Dealing 3000.

The paper finds statistically significant price-impact effects of changes in limit orders after accounting for the effects of market orders.
1. Empirical Results

2. Features of the model.

3. Interpretation
### Empirical Results

#### Table 3: In-Sample Fit of Portfolio Shift Model: Daily Data

This table presents estimation results of the portfolio shift model equation based on daily data along with Evans-Lyons type equation for three exchange rates. OLS panel reports the estimation results based on the OLS method. IV GMM reports the estimation results using the instrumental variable GMM approach. We use up to 5 lags of market, net new limit and net cancellation order flows from all 3 markets which are statistically significant in one of the first-stage regression at the 5% level. T-statistics are given in parentheses.

Panel B presents Wald test statistics and p-values (in parentheses) for the coefficient restrictions based on daily data. Standard errors are adjusted for autocorrelation. The sample period is from January 2, 2003 to December 30, 2004.

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<th>GBP/USD</th>
<th>EUR/USD</th>
<th>EUR/GBP</th>
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<tr>
<td></td>
<td>mo</td>
<td>lo</td>
<td>$R^2$</td>
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<td><strong>Panel A: Estimation results</strong></td>
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<tr>
<td>OLS</td>
<td>76.12 (9.44)</td>
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<td>14.5</td>
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<tr>
<td>OLS</td>
<td>125.70 (20.6)</td>
<td>112.49 (22.8)</td>
<td>57.3</td>
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<tr>
<td>IV GMM</td>
<td>126.23 (7.61)</td>
<td>117.30 (3.47)</td>
<td>57.2</td>
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<td><strong>Panel B: Testing restrictions</strong></td>
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<tr>
<td>OLS</td>
<td>4.36 (0.037)</td>
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<tr>
<td>IV GMM</td>
<td>0.20 (0.652)</td>
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Question: Why does “limit order flow” have such incremental explanatory power?
The PS Model

Information Flow in the PS model

Customer orders \rightarrow Interdealer trades \rightarrow

Aggregate Interdealer Order Flow \rightarrow FX Quote Revision

- This works because dealers find it optimal to base their Interdealer trades on customer orders.
- There is no information leakage because dealers only trade with each other.
KMP allow dealers to submit limit orders in round II

Limit orders are matched with exogenous market orders with a fixed probability

Dealers face a risk-return tradeoff in choosing between limit orders and market orders in round II

- limit orders offer a better return conditional on execution, but are subject to execution risk
In the original PS model, inter-dealer order flow contains price-relevant information because:

- dealers’ optimal trading decisions aggregate dispersed information on customer orders from round I, and
- optimal risk-sharing requires that dealers hold no FX overnight

These features remain in the the KMP variant, and

- dealers find it optimal to base their limit orders on their round I customer orders. Specifically

\[
M_t^i = \alpha_m c_{1,t}^i + \omega_m s \\
L_t^i = \alpha_l c_{1,t}^i + \omega_l s
\]
Implications of

\[ M_t^i = \alpha_m c_{1,t}^i + \omega_m s \quad \text{and} \quad L_t^i = \alpha_l c_{1,t}^i + \omega_l s \]

- Dealers market and limit trades aggregate round I information on customer trades.
- Aggregate market and limit orders \( M_t = \sum_i M_t^i \) and \( L_t = \sum_i L_t^i \) are perfectly correlated (because the probability of limit order execution is constant) \( \implies \)
- Identifying the marginal impact of limit orders on prices is impossible:

\[ P_{3,t} = P_{2,t} + \beta_m M_t + \beta_l L_t \]
Data on market and limit orders comes from Reuters D3000:

- Reflects decisions by dealers to use market or limit orders for interdealer trades in a limit order book,
- D3000 data identifies different trades in the same market setting.

In the KMP variant, dealers choose between different market settings.

- Reciprocity only required in direct trading
  - (and is an important factor in determining trades in the PS model)
- Execution risk factors into trading decisions in the model and data,
- Execution risk is not (perceived to be) constant in the data (see Table 1)
My Take Aways

- Interesting Empirical Results

- I’m not convinced that the KMP variant provides an explanation (yet?)

- Next steps:
  - explore the determinants of execution risk in the data
  - extend the model to allow for state dependent execution risk