

# Market Order Flows, Limit Order Flows and Exchange Rate Dynamics

by Kozhan, Moore and Payne

Martin D. D. Evans (Georgetown University)

October 2012

- 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

	GBP/USD			EUR/USD			EUR/GBP		
<i>Panel A: Estimation results</i>									
	<i>mo</i>	<i>lo</i>	$\bar{R}^2$	<i>mo</i>	<i>lo</i>	$\bar{R}^2$	<i>mo</i>	<i>lo</i>	$\bar{R}^2$
OLS	76.12 (9.44)		14.5	57.22 (6.80)		8.1	47.51 (6.56)		7.5
OLS	125.70 (20.6)	112.49 (22.8)	57.3	139.60 (12.7)	105.09 (10.5)	24.0	117.75 (19.3)	113.32 (22.0)	52.1
IV GMM	126.23 (7.61)	117.30 (3.47)	57.2	176.60 (4.73)	154.44 (3.16)	20.5	102.92 (3.70)	87.46 (1.97)	49.7
<i>Panel B: Testing restrictions</i>									
OLS	4.36 (0.037)			18.89 (0.000)			0.64 (0.423)		
IV GMM	0.20 (0.652)			2.11 (0.147)			0.77 (0.381)		

Question: Why does “limit order flow” have such incremental explanatory power?

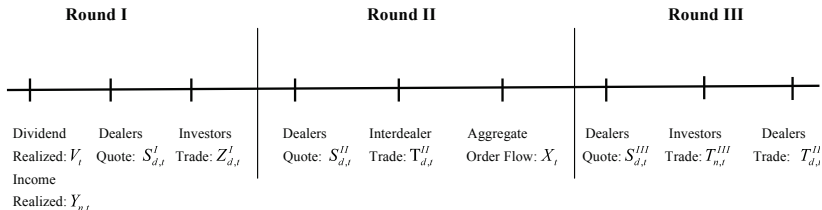
## Information Flow in the PS model

*Customer orders* → *Interdealer trades* →

*Aggregate Interdealer Order Flow* → *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.

# The KMP Variant



- 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

$$M_t^i = \alpha_m c_{1,t}^i + \omega_m s \quad L_t^i = \alpha_l c_{1,t}^i + \omega_l s$$

Implications of

$$M_t^i = \alpha_m c_{1,t}^i + \omega_m s \quad L_t^i = \alpha_l c_{1,t}^i + \omega_l s$$

- 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:
  - $\simeq$  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)

- 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