



Exchange-Rate Dynamics

Chapter 7



Martin D. D. Evans

Currency Trading Models: Empirical Evidence

Outline

1. Daily Analysis
 1. Single Currency Results
 2. Multiple Currencies
 3. Dealer Order Flow and Customer Order Flow
2. Intraday Analysis
 1. Vector Autogressions
 2. VAR Models of Intraday Trading
 3. Decentralized Trading Models
 4. Forecasting Order Flow and Feedback Trading
3. Summary

7.1 Daily Analysis: Single Currency Results

Table 1: Estimates of the Portfolio Shifts Model

		Regressors			Diagnostics		
		X_t	$\Delta(r_t - \hat{r}_t)$	$r_{t-1} - \hat{r}_{t-1}$	R^2	Serial	Hetero
DM/USD	I	2.14 (0.29)	0.51 (0.26)		0.64	0.77 0.40	0.07 0.02
	II	2.15 (0.29)			0.63	0.73 0.45	0.05 0.03
	III		0.62 (0.77)		0.01	0.78 0.77	0.92 0.99
	IV	2.15 (0.29)		0.02 (0.01)	0.64	0.49 0.43	0.17 0.01
	V			0.02 (0.02)	0.00	0.04 0.24	0.83 0.98
JPY/USD	I	2.86 (0.36)	2.47 (0.92)		0.46	0.06 0.44	0.92 0.74
	II	2.61 (0.36)			0.40	0.19 0.33	0.60 0.83
	III		0.57 (1.20)		0.00	0.85 0.81	0.13 0.67
	IV	2.78 (0.38)		0.02 (0.01)	0.42	0.00 0.03	0.66 0.72
	V			0.01 (0.01)	0.00	0.12 0.46	0.18 0.79

Source: Evans and Lyons (2002b)

Note:

- The coefficient on order flow of 2.1 implies that \$1 billion of net purchases increasing the DM price of a dollar by 0.8 pfennigs.
- Almost all the explanatory power in the regressions is due to order flow.

7.1 Daily Analysis: Single Currency Results

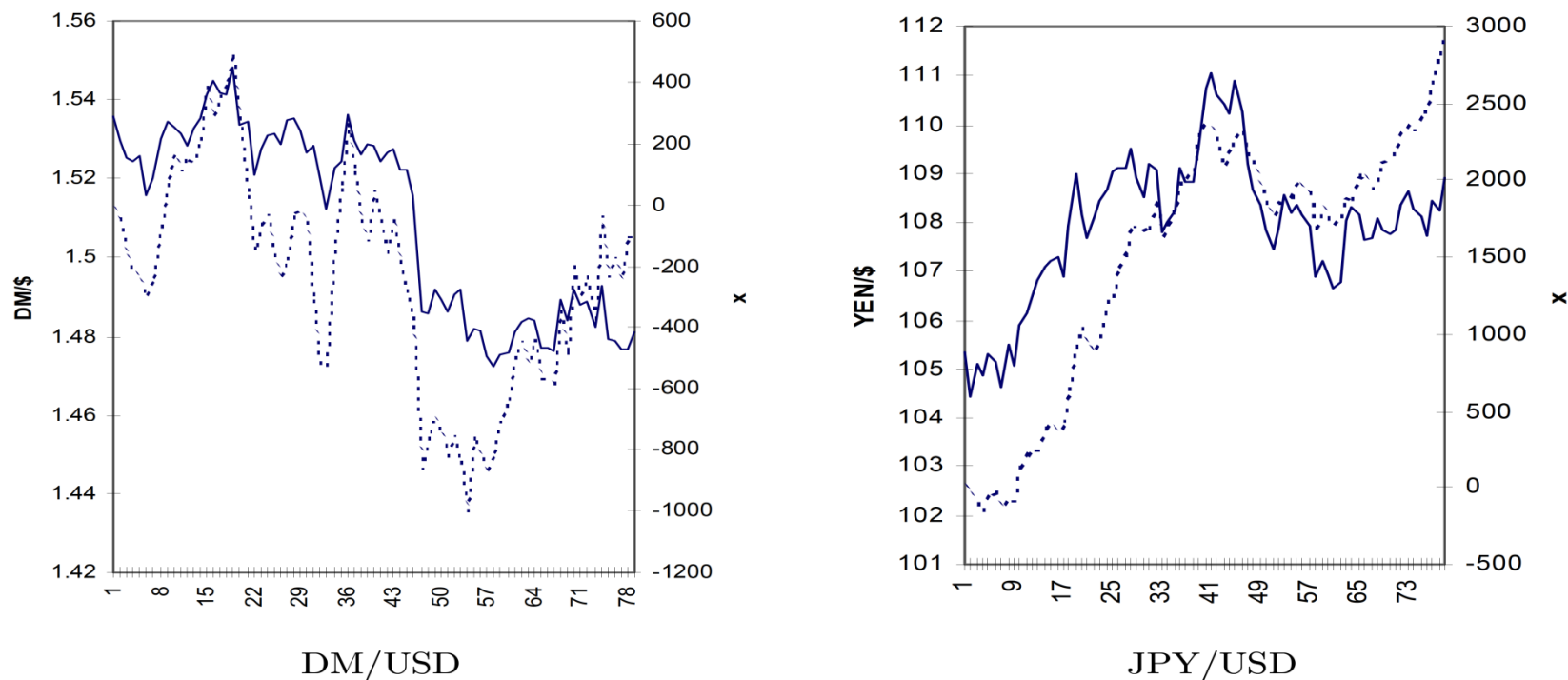


Figure 1: Exchange Rates (solid) and Cumulative Order Flow (dashed)

- Although (7.2) is estimated at the daily frequency, the estimation results have implications for the behavior of spot rates over much longer periods.
- There is no detectable serial correlation in daily order flows.

7.1 Daily Analysis: Multiple Currencies

Table 2: Multi-Currency Estimates of the Portfolio Shifts Model

	Order Flows									R^2 's
	DM	JPY	GBP	BF	CHF	NOK	FF	LRA	GLD	
DM	1.63 (0.26)	0.16 (0.22)	-0.22 (0.47)	-1.55 (2.77)	1.33 (0.38)	1.39 (4.69)	1.24 (0.90)	1.73 (1.64)	4.11 (3.48)	0.76 0.68
JPY	-0.11 (0.28)	2.16 (0.29)	-0.88 (0.68)	5.49 (3.67)	1.34 (0.57)	-4.10 (6.36)	1.76 (1.38)	0.24 (2.63)	-0.24 (4.73)	0.54 0.45
GBP	0.65 (0.22)	0.04 (0.28)	2.69 (0.62)	-4.54 (3.67)	0.01 (0.44)	-2.18 (7.19)	-0.27 (1.00)	3.17 (1.82)	-0.22 (3.62)	0.45 0.33
BF	1.38 (0.20)	0.18 (0.18)	0.00 (0.49)	-3.26 (2.24)	1.42 (0.35)	2.79 (4.34)	1.87 (0.82)	2.31 (1.64)	4.32 (2.98)	0.78 0.00
CHF	1.45 (0.33)	0.75 (0.32)	-0.53 (0.72)	-4.96 (4.25)	2.89 (0.59)	-8.26 (7.24)	0.90 (1.35)	2.94 (2.54)	4.65 (4.62)	0.70 0.53
NOK	0.91 (0.30)	0.23 (0.29)	0.68 (0.62)	-2.27 (3.07)	2.19 (0.49)	0.23 (5.35)	1.74 (1.16)	1.36 (1.90)	7.72 (3.88)	0.69 0.00
FF	1.13 (0.19)	0.11 (0.19)	0.06 (0.51)	-1.94 (2.60)	1.02 (0.35)	-6.37 (4.42)	2.17 (0.79)	4.21 (1.62)	5.33 (3.12)	0.75 0.40
LRA	0.68 (0.18)	-0.12 (0.20)	-1.07 (0.30)	-2.40 (2.39)	0.11 (0.29)	-15.66 (3.82)	0.21 (0.76)	10.90 (1.21)	4.45 (2.34)	0.65 0.37
GLD	1.36 (0.22)	0.18 (0.21)	-0.23 (0.54)	-1.85 (2.56)	1.61 (0.37)	1.02 (5.11)	1.83 (0.87)	3.68 (1.72)	6.18 (3.45)	0.75 0.06

All order flows

Own-currency Order Flow

Source: Evans and Lyons (2002a) All currencies pairs are verses the US Dollar: The currency identifiers are: DM = German Deuschmark, YPY = Japanese Yen, GBP = British Pound, BF = Belgium Franc, CHF = Swiss France, NOK = Norwegian Krona, FF = French Franc, LRA = Italian Lira, and GLD = Dutch Guilder.

7.1 Daily Analysis: Multiple Currencies

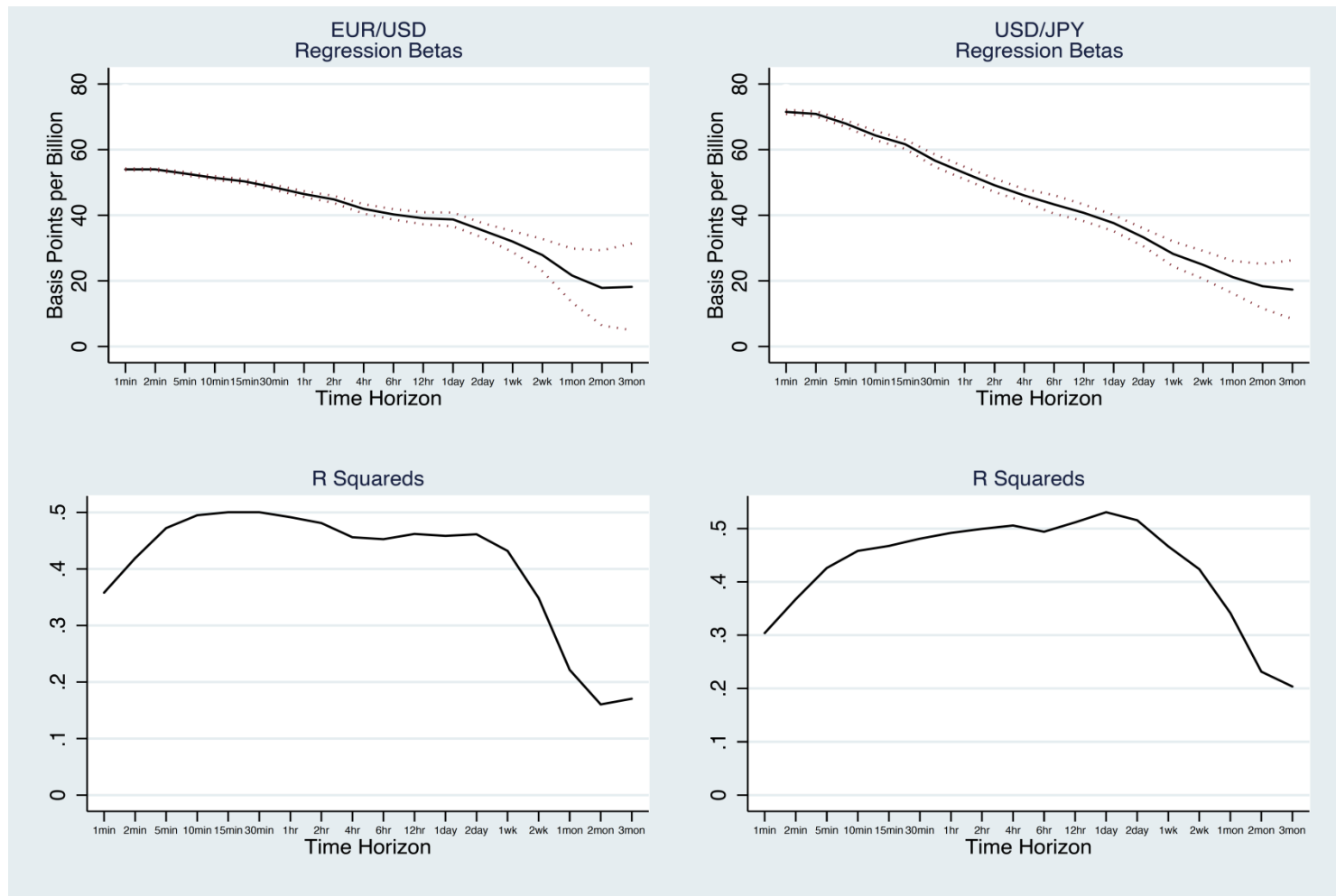


Figure 2: The Exchange Rate Order Flow Relation in EBS Data: Source Chaboud et. al (2007)

7.1 Daily Analysis: Dealer Order Flow and Customer Order Flow

Table 3 shows the results of regressing excess returns on Citibank's customer flows at the one day, one week and one month horizon.

Table 3: Exchange Rates and Customer Order Flows								
Horizon	Corporate		Hedge		Investors		Aggregate	R^2 (p-value)
	US	Non US	US	Non US	US	Non US		
1 day							0.112	0.018
							(0.028)	(<0.001)
1 week	-0.147	-0.214	0.153	0.194	-0.029	0.353	0.078	
	(0.107)	(0.064)	(0.054)	(0.056)	(0.121)	(0.059)	(<0.001)	
1 month							0.173	0.054
							(0.036)	(<0.001)
1 month	-0.167	-0.358	0.275	0.069	-0.051	0.447	0.195	
	(0.133)	(0.077)	(0.064)	(0.090)	(0.143)	(0.080)	(<0.001)	
1 month							0.227	0.092
							(0.066)	(<0.001)
1 month	0.120	-0.376	0.214	-0.074	0.000	0.583	0.299	
	(0.185)	(0.102)	(0.137)	(0.196)	(0.208)	(0.130)	(<0.001)	

Source: Evans and Lyons (2004a)

7.2 Intraday Analysis: Decentralized Trading Models

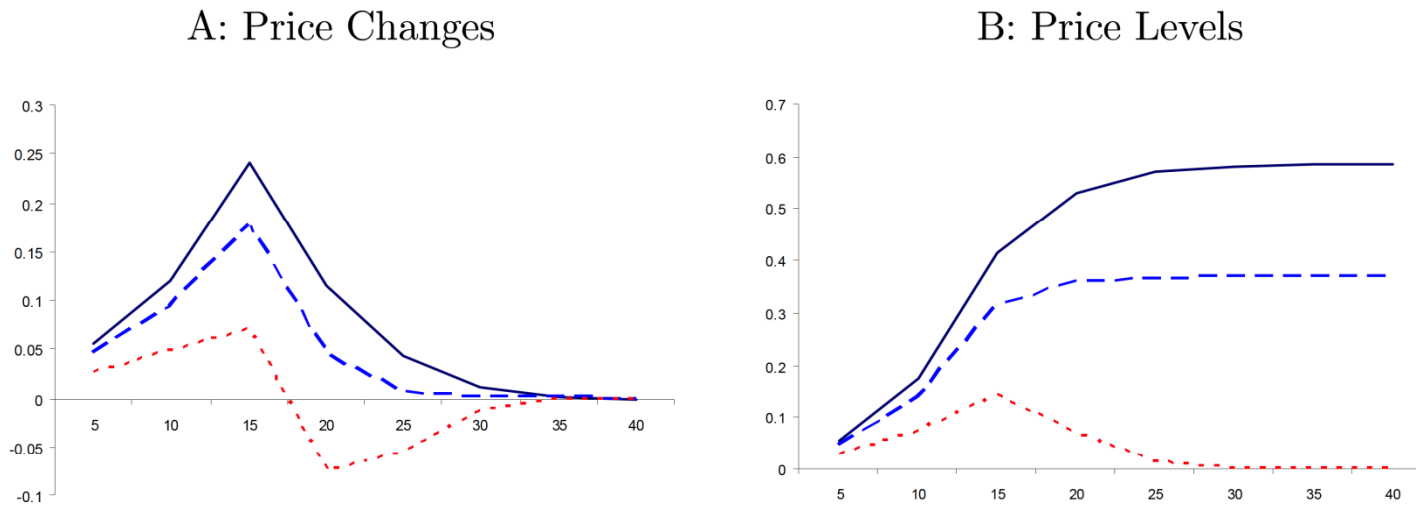


Figure 3: Impulse responses of average transaction prices to a one unit positive shock in dispersed information at different levels of trade intensity, n : solid $n = 150$, dashed $n = 100$, short dashed $n = 25$.

Note:

- The dynamic response of prices seems to vary considerably with trade intensity.
- Dispersed information shocks have their largest (positive) effect on price changes during the third period, 15 minutes after the shock.

7.2 Intraday Analysis: Decentralized Trading Models

Table 4: Variance Contributions			
Trade Intensity n	Horizon k in minutes		
	5	60	120
A: $\mathbb{V}(\omega_t^o - \omega_{t-k}^o) / \mathbb{V}(\Delta^k S_t^o)$			
25	91.37%	47.64%	31.42%
100	69.61%	13.79%	7.33%
150	56.60%	6.88%	3.48%
B: $\mathbb{V}(B(L, k, n)\xi_t) / \mathbb{V}(\Delta^k S_t^o)$			
25	0.38%	0.74%	0.49%
100	3.25%	21.71%	24.10%
150	8.53%	42.22%	45.07%

Notes: Variance Contributions computed from estimates of the Evans Intraday model. Source, Evans (2002).

7.2 Intraday Analysis: Forecasting Order Flow and Feedback Trading

1. Assume that each transaction is for \$5m. and $n=60$.
2. Compute the ψ_j coefficients from day T-1 order flow and price data.
3. Use the estimated trading rule together with price data from day T to compute daily return and profits in USD, DM: $r^\$, r^{DM}, \Pi^\$, and \Pi^{DM}$.
4. This procedure is repeated for each day in the dataset.
5. Repeat the above calculations 1000 times using data generated from estimates of the Evans Intraday model with $n=60$

Table 5: Profitability of Feedback Trading

	r^{DM}	π^{DM}	$r^\$$	$\pi^\$$
median	-0.91%	-1.37m	-0.92%	-0.92m
p-value	58.30%	58.30%	58.40%	58.40%