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Small Traders in Currency Futures Markets

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Small traders in currency futures markets

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Abstract

This study examines the interrelation between small traders' open interest and large hedging and speculation in the Canadian dollar, Swiss franc, British pound, and Japanese yen futures markets. The results, based on Granger-causality tests and vector autoregressive models, suggest that small traders' open interest is closely related to large speculators' open interest. Small traders and speculators tend to herd, which means that small traders are long [short] when speculators are long [short] as well. Moreover, small traders and speculators are positive feedback traders whereas hedgers are contrarians. Regarding information flows, speculators lead small traders in three of the four currency futures markets. The results therefore suggest that small traders are small speculators who follow the large speculators, indicating that they are less well informed than the large speculators.

JEL classification: F31, G15

Keywords: Currency futures; small traders; speculation; hedging

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1 Introduction

With respect to empirical research on the performance of futures markets, Peck (1982, p. 181) describes the Commitment of Traders (COT) reports provided by the Commodity Futures Trading Commission (CFTC) as "[...] potentially a veritable gold mine of information [...]" with one major limitation. Certainly the COT reports allow for a detailed analysis of the distribution between speculative and hedging positions in futures markets, which functions as a signal for the performance and stability of futures markets.[1] However, the limitation pointed out by Peck (1982) regards the fact that small (non-reporting) traders are not classified as either speculative or hedging. Since the proportion of large traders generally varies over time and among markets, the relation between open interest of large speculators and large hedgers may not be representative of the distribution of total open interest in the market. Especially in markets with significant involvement of small traders, analyzing positions of large traders in isolation may not yield adequate results regarding the overall speculative activity in these markets (Chatrath and Song, 1999). One suggestion on how to deal with this problem is to estimate a lower and an upper bound of speculative activity (Working, 1960; Larson, 1961; Rutledge, 1977; Peck, 1980). Classifying all small traders as speculators [hedgers] gives an upper [lower] bound of speculative activity.

More recent research suggests viewing small traders as a third category of traders. Wang (2002a, 2003) argues that small traders are liquidity traders because no clear-cut patterns of trading activity are visible. Stein and Hong (1990) find that large traders have superior forecasting ability compared to small traders. In contrast, Tao and Song (2010) report that small traders are not uninformed and play a significant role in the price discovery in the Hang Seng index markets. Hence, empirical results on how to classify small traders have basically been inconclusive. The discussion of whether small traders are speculators, hedgers or whether they represent a third category of traders is still not settled.

The results of Stein and Hong (1990), Wang (2002a) and Tao and Song (2010) are all based on an analysis of how information is incorporated into prices. Their approaches therefore represent an indirect way of analyzing information flows between traders. In contrast, the present study directly analyzes the connection between these types of traders by estimating Granger-causality and pairwise vector autoregression (VAR) models for the respective open interest in short and long Canadian dollar, Swiss franc, British pound, and Japanese yen futures contracts. The present study therefore follows the advice of Working (1960, p. 190), who argues that "[...] we need to study the statistics of open contracts in order to learn the extent of connection between hedging and speculation."

The contribution of this study is threefold. First, the empirical results suggest that long [short] trading activity of small traders is closely related to long [short] speculative and short [long] hedging activity, suggesting that small traders are speculators. These results support earlier findings regarding herding behavior among speculators, as well as economic theory which states that long [short] hedging attracts short [long] speculation and vice versa (Keynes, 1930; Hicks, 1939; Working, 1953). Second, the analysis of the reactions of traders' long and short positions to futures returns leads to the conclusion that small traders and speculators are positive feedback traders whereas hedgers are contrarians. This finding holds true for all futures markets examined, supporting the previous finding that small traders are speculators. Third, Granger-causality test results indicate that large speculators lead small speculators in three of the four markets. This finding points to asymmetric information between large and small speculators, and to information flows from large to small speculators.

The remainder of this paper is organized as follows. The second section presents the data and introductory statistics. The third section analyzes the relations between the trading positions of small traders, speculators and hedgers. The fourth section investigates traders' reactions to futures returns. The fifth section discusses information flows between large and small speculators. Finally, the sixth section

provides the conclusions.

2 Data and introductory statistics

This investigation is conducted with respect to four currency futures contracts traded at the Chicago Mercantile Exchange (CME), the Canadian dollar (CAD), Swiss franc (CHF), British pound (GBP), and Japanese yen (JPY) from 6 October 1992 to 2 March 2010. The interval was chosen because weekly Commitment of Traders (COT) data are not available prior to October 1992. The COT reports are compiled by the Commodity Futures Trading Commission (CFTC). The reports provide information on the open interest of large hedgers (commercial traders), large speculators (non-commercial traders) and small traders (non-reporting traders).[2] The commercial and non-commercial trader classification is given to traders whose futures positions exceed the CFTC reporting levels (400 contracts for currencies as of 1 April 2009).[3] Small traders' positions do not exceed the reporting levels and are not classified as either hedging or speculation.

Figure 1 shows the distribution of total open interest in long and short futures contracts. Hedgers dominate all markets almost over the entire time interval. Graphical inspection suggests that the open interest of small traders exceeds the open interest of large speculators quite regularly. For example, regarding the British pound long futures contract, small traders' open interest exceeded 50% of total open interest in October 2002. A further finding regarding Figure 1 is that the open interest of small traders appears to be more closely related with that of large speculators rather than with that of large hedgers. In times when hedging activity dominates, both small traders' and large speculators' open interest are rather low (e.g. *CHF-Long* from about 2005 to 2007). In contrast, if large speculators are very active then small traders' open interest increases as well (e.g. *CHF-Long* from about 2001 to 2004). This finding supports earlier results by Wang (2002a) who argues that while hedgers and speculators tend to move in opposite directions, the trading of small

traders and speculators moves in the same direction.

The empirical investigation employs changes (i.e. first differences) in open interest of long speculators (SL), short speculators (SS), long hedgers (HL), short hedgers (HS), long small traders (SML), and short small traders (SMS). Summary statistics and results of unit root tests are presented in Table 1. In addition to changes in open interest, Table 1 also reports summary statistics for futures returns R which are defined as $R_t = log(P_t/P_{t-1})$ with P_t the futures settlement price at time t. The stationarity of the series are checked using both the augmented Dickey Fuller (ADF) and Kwiatkowski-Phillips-Schmidt-Shin (KPSS) tests. If the ADF test rejects the null hypothesis of nonstationarity while the KPSS test fails to reject the null hypothesis of stationarity, then there is strong evidence in favor of a stationary process. This joint testing approach, called confirmatory analysis because the KPSS test is used to confirm the results of the ADF test, gives the most reliable results if both tests indicate that the series are stationary.[4] The joint testing results presented in Table 1 suggest that all series are stationary.

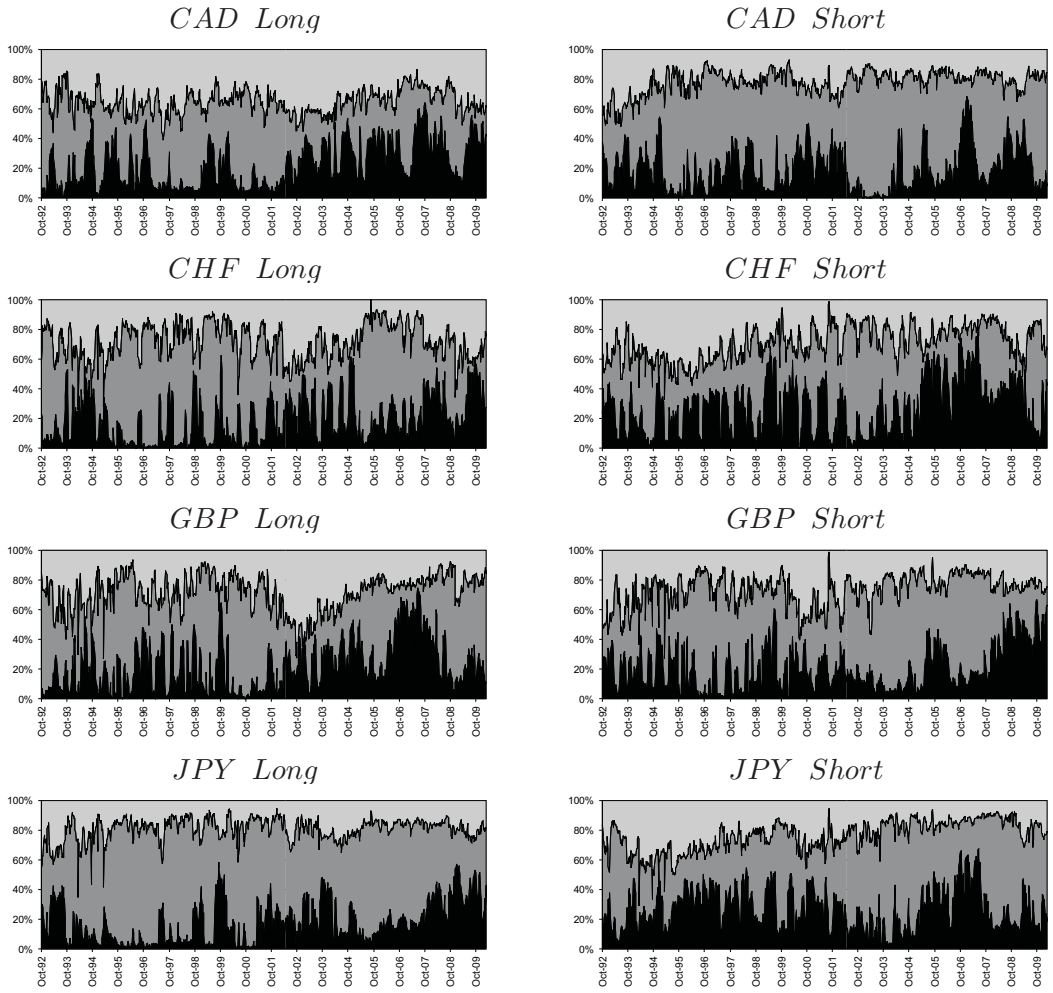

Figure 1: Large speculators (black), large hedgers (dark gray), and small traders (light gray): Percent of total open interest.

Table 1: Summary statistics and unit root tests.

Series		Obs.	Mean	Max.	Min.	Std. Dev.	Skewness	Kurtosis	ADF	KPSS
CAD	*SML*	908	38.95	10247	-12974	2562.40	-0.4245	6.2019	0.0000	0.0428
	SMS	908	5.01	22017	-21888	2822.91	-0.4519	17.1555	0.0000	0.0458
	SL	908	51.25	24504	-26345	5262.47	-0.2459	7.4882	0.0000	0.0167
	SS	908	-1.93	27936	-22948	4518.41	0.1502	9.1216	0.0000	0.0172
	HL	908	-0.63	37169	-89495	8371.17	-2.4452	22.6790	0.0000	0.0346
	HS	908	86.49	51822	-59503	9064.34	-1.1318	10.1403	0.0000	0.0182
	R	908	0.00	0.1127	-0.0629	0.0117	0.6778	14.3193	0.0000	0.2994
CHF	*SML*	906	-3.14	23006	-28287	3382.22	-0.2869	17.2690	0.0000	0.0218
	SMS	906	2.99	22644	-26591	3208.22	-0.9065	15.7734	0.0000	0.0507
	SL	906	4.65	22555	-18364	4084.61	-0.0551	7.5105	0.0000	0.0131
	SS	906	11.54	28404	-29202	5220.87	-0.2947	8.8850	0.0000	0.0271
	HL	906	10.04	55573	-73718	9637.35	-1.2123	11.7461	0.0000	0.0419
	HS	906	-2.97	34726	-66125	8997.02	-1.8133	13.6809	0.0000	0.0256
	R	906	0.00	0.0902	-0.0562	0.0155	0.3022	4.8874	0.0000	0.1632
GBP	*SML*	908	17.47	22242	-32596	3558.44	-0.6469	22.2487	0.0000	0.0390
	SMS	908	18.63	27297	-31270	3480.45	-0.6970	22.2086	0.0000	0.2010
	SL	908	14.02	29299	-44734	6133.23	-0.5225	12.1463	0.0000	0.0449
	SS	908	79.99	21315	-23081	4077.26	-0.1199	8.4903	0.0000	0.2313
	HL	908	78.18	32900	-81671	9615.93	-2.0251	15.5148	0.0000	0.1073
	HS	908	11.05	41013	-92830	10200.42	-2.2882	20.1596	0.0000	0.0689
	R	908	-0.00	0.0479	-0.0705	0.0132	-0.3094	5.0275	0.0000	0.1041
JPY	*SML*	908	4.10	38342	-47524	4767.12	-0.9334	26.0437	0.0000	0.0795
	SMS	908	21.78	43316	-44851	4976.14	-0.6723	23.3695	0.0000	0.0848
	SL	908	48.24	37081	-45828	6427.52	-0.2152	10.7800	0.0000	0.0442
	SS	908	19.99	48430	-81315	9630.44	-1.2027	16.1458	0.0000	0.0355
	HL	908	42.36	69201	-101513	15176.02	-1.3496	10.6493	0.0000	0.0718
	HS	908	52.93	65066	-130694	15809.54	-1.9598	13.8174	0.0000	0.0511
	R	908	0.00	0.0930	-0.0624	0.0156	0.6152	6.1581	0.0000	0.0903

Notes: Augmented Dickey Fuller (ADF): p-value for the null hypothesis of nonstationarity. The Kwiatkowski-Phillips-Schmidt-Shin (KPSS) test rejects the null hypothesis of stationarity if the test statistic exceeds the critical value: 1%: 0.7390; 5%: 0.4630; 10%: 0.3470.

3 The relations between large and small traders

In order to investigate the interrelations between large and small traders the following hypotheses are formed:

> *H1*: If small traders are speculators, then there is a causality between long [short] hedging positions and short [long] positions of small traders.
>
> *H2*: If small traders are speculators, then there is a causality between long [short] speculative positions and long [short] positions of small traders.
>
> *H3*: If small traders are hedgers, then there is a causality between long [short] speculative positions and short [long] positions of small traders.
>
> *H4*: If small traders are hedgers, then there is a causality between long [short] hedging positions and long [short] positions of small traders.

Hypotheses *H1* and *H3* are based on the assumption that hedgers and speculators are generally on opposite sides of the futures market. These hypotheses correspond to the Keynesian view that if hedgers are net short, speculators should fill the gap and be net long to restore equilibrium. By reacting to hedgers' needs, speculators should earn a risk premium (Keynes, 1930; Hicks, 1939). However, hypotheses *H1* and *H3* also correspond to the competing theory that hedgers prefer highly liquid markets, and therefore markets with a high proportion of speculative activity (Working, 1953; Röthig, 2010). According to this theory, markets with long [short] speculative activity will attract hedgers to open short [long] positions.

Hypotheses *H2* and *H4* are based on the assumptions that traders may herd, which means that their trades are not independent but correlated (Kaldor, 1939; Nofsinger and Sias, 1999; Röthig and Chiarella, 2007). Herding may result because of both fundamental and non-fundamental factors. Fundamental factors include the arrival of new information, for example macroeconomic news, to which traders react in a similar way. Non-fundamental factors include technical analysis and chartism

(Manzan and Westerhoff, 2007; Westerhoff, 2008). If different speculators apply similar trading rules, then their trades will be correlated. While there are numerous studies on herding behavior of speculators, there is rarely any literature dealing with correlated trades of hedgers. Here, the reasoning is similar to the previous one regarding the interactions of speculators. First, hedgers may react similarly to fundamental factors. In addition, also non-fundamental factors apply here. If hedgers use similar hedging and risk assessment models, they will follow common signals and therefore trade in parallel.

Table 2: Granger-causality tests.

Panel A: Test results for hypotheses *H1* and *H2*				
Pair	CAD	CHF	GBP	JPY
$SL \rightarrow SML$	0.0000	0.0000	0.0000	0.0000
$SS \rightarrow SMS$	0.0000	0.0000	0.0000	0.0000
$HL \rightarrow SMS$	0.0000	0.0000	0.0000	0.0000
$HS \rightarrow SML$	0.0083	0.0000	0.0000	0.0000
Panel B: Test results for hypotheses *H3* and *H4*				
Pair	CAD	CHF	GBP	JPY
$SL \rightarrow SMS$	0.9832	0.0139	0.1958	0.3622
$SS \rightarrow SML$	0.1203	0.0000	0.0002	0.0005
$HL \rightarrow SML$	0.0000	0.2237	0.3804	0.4985
$HS \rightarrow SMS$	0.0003	0.1541	0.1269	0.0850

Notes: $X \rightarrow Y$: p-value for the null hypothesis that X does not Granger-cause Y.

Hypotheses *H1* to *H4* are examined in a lead-lag framework using Granger-causality tests and impulse response functions based on vector autoregression models. The results presented in Panel A of Table 2 suggest that there is a significant relation between the trading activity of long [short] speculators and long [short] small traders. In addition, there is a significant relation between short [long] positions of hedgers and long [short] positions of small traders. These findings support hypotheses *H1* and *H2*, and therefore suggest that small traders are speculators. In

contrast, the results in Panel B of Table 2 are mixed, and do not point to small traders being hedgers. Overall, these results suggest that small traders are speculators. Moreover, since long [short] speculation Granger causes long [short] activities of small traders, the results point to herding activities among large and small speculators. However, if large speculators and small traders herd, then an increase of large speculators' trading activity in long [short] futures contracts should lead to an increase of small traders' trading activity in long [short] futures contracts. This is analyzed using impulse response functions based on vector autoregression (VAR) models. The bivariate VAR model, where there are two variables, X_t and Y_t, is expressed as follows:

$$\begin{aligned} X_t &= a_{10} + \sum_{i=1}^{n} a_{1i} X_{t-i} + \sum_{i=1}^{n} b_{1i} Y_{t-i} + \varepsilon_{1t} \\ Y_t &= a_{20} + \sum_{i=1}^{n} a_{2i} Y_{t-i} + \sum_{i=1}^{n} b_{2i} X_{t-i} + \varepsilon_{2t} \end{aligned} \tag{1}$$

where n represents the number of lags and ε_{jt} are the error terms with $j = 1, 2$. The number of lags of the bivariate VAR models, which are determined using the minimum value of the Akaike, Hannan-Quinn, and Schwartz information criteria, are presented in parentheses in Figures 2 to 7. The impulse response function labeled $X \rightarrow Y$ represents the response of Y to a Cholesky one standard deviation innovation in X.[5] Figures 2 to 7 present the effects of a shock in X upon Y over a time period of ten weeks.

Figure 2 corresponds to hypotheses *H1* and *H2* (Panel A of Table 2) and Figure 3 corresponds to hypotheses *H3* and *H4* (Panel B of Table 2). Each of the 16 impulse response functions presented in Figure 2 suggests that an increase in large speculators' long [short] and large hedgers' short [long] positions leads to an increase of small traders' long [short] positions for about one or two periods (i.e. weeks), supporting hypotheses *H1* and *H2*. More precisely, the results point to herding activities among

large speculators and small traders and the results suggest that long [short] hedgers attract short [long] small traders to open positions in the futures market. These findings clearly suggest that small traders are speculators. In contrast, the impulse response functions presented in Figure 3 do not show positive responses of small traders' long [short] trading activity to increases in long [short] hedging and short [long] speculation. A further interesting finding, supporting hypotheses *H1* and *H2*, is the following. Regarding the findings in Panel B of Table 2, the most significant causality presented refers to the relation between short speculation and long positions of small traders. In three out of four cases the Granger-causality test results are highly significant (CHF, GBP, JPY), and the corresponding impulse responses shown in Figure 3 are negative. This result supports the herding assumption stated in hypothesis *H2*. Hence, not only does an increase in short speculation lead small traders to increase their short positions (Figure 2), but also to decrease their long positions (Figure 3). Again, this result points to small traders being speculators.

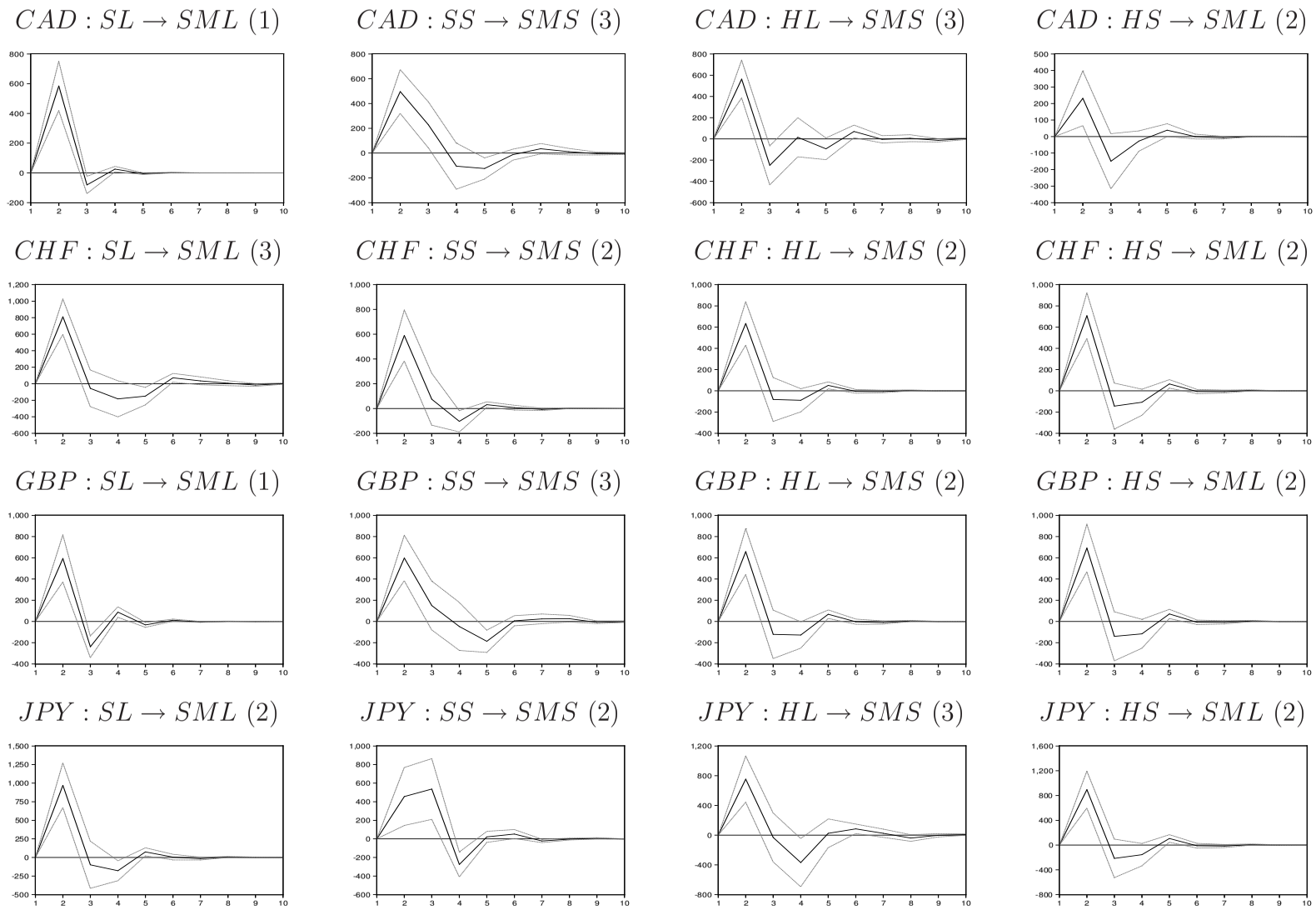

Figure 2: Impulse response functions corresponding to Panel A in Table 2. The number of lags of the bivariate VAR models, which are determined using Akaike, Hannan-Quinn, and Schwartz information criteria, are presented in parentheses.

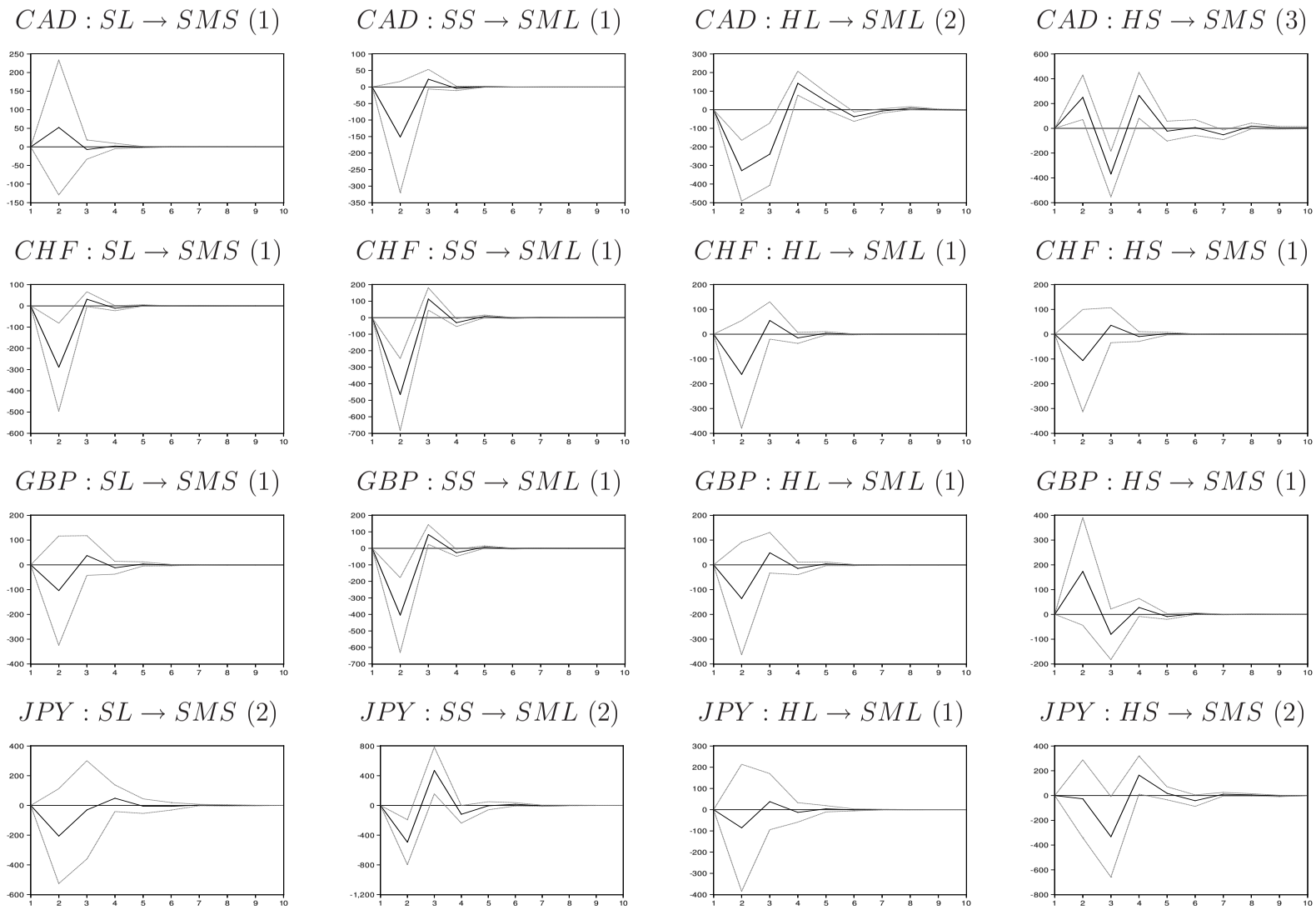

Figure 3: Impulse response functions corresponding to Panel B in Table 2. The number of lags of the bivariate VAR models, which are determined using Akaike, Hannan-Quinn, and Schwartz information criteria, are presented in parentheses.

4 Traders' positions and futures returns

This section is concerned with the reactions of traders to futures returns. We formulate the following hypotheses:

> *H5*: If small traders are speculators, then their reactions to futures returns should resemble those of large speculators.
>
> *H6*: If small traders are hedgers, then their reactions to futures returns should resemble those of large hedgers.

These hypotheses are again analyzed using vector autoregression models. Figures 4 to 7 present the responses of traders' long and short positions to an increase in futures returns. The results clearly support hypothesis *H5*, and therefore the previous findings that small traders are speculators. The reactions of small traders to a shock in futures returns are very similar to those of speculators, but quite different to those of hedgers. Small traders and large speculators increase [decrease] their long [short] positions after an increase in returns in all markets investigated. Hence, small traders and speculators are positive feedback traders. In contrast, hedgers decrease [increase] their long [short] positions after an increase in returns, and therefore act like contrarians. Hence, the results do not support hypothesis *H6*.

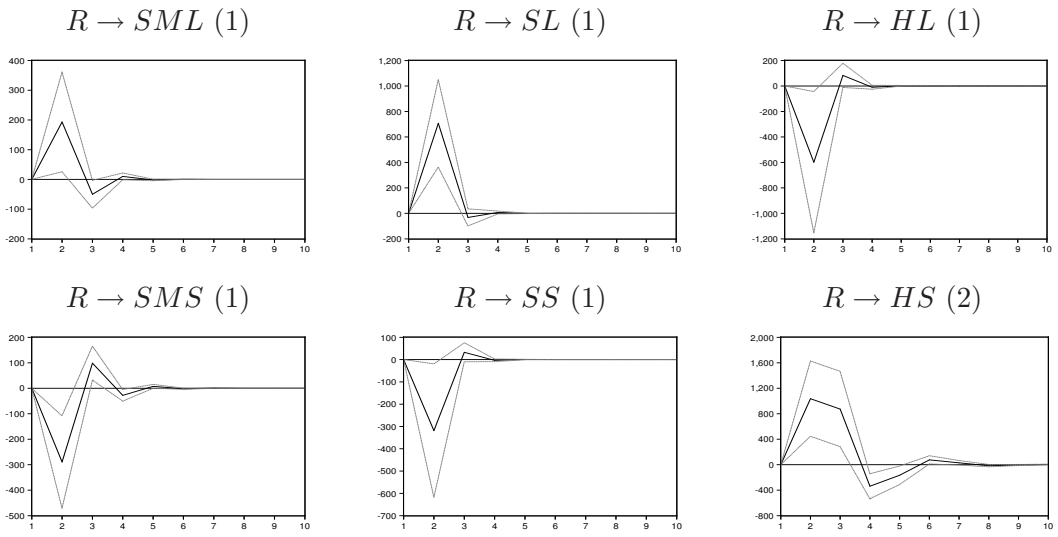

Figure 4: CAD: Effect of returns on long and short trading activity. The number of lags of the bivariate VAR models, which are determined using Akaike, Hannan-Quinn, and Schwartz information criteria, are presented in parentheses.

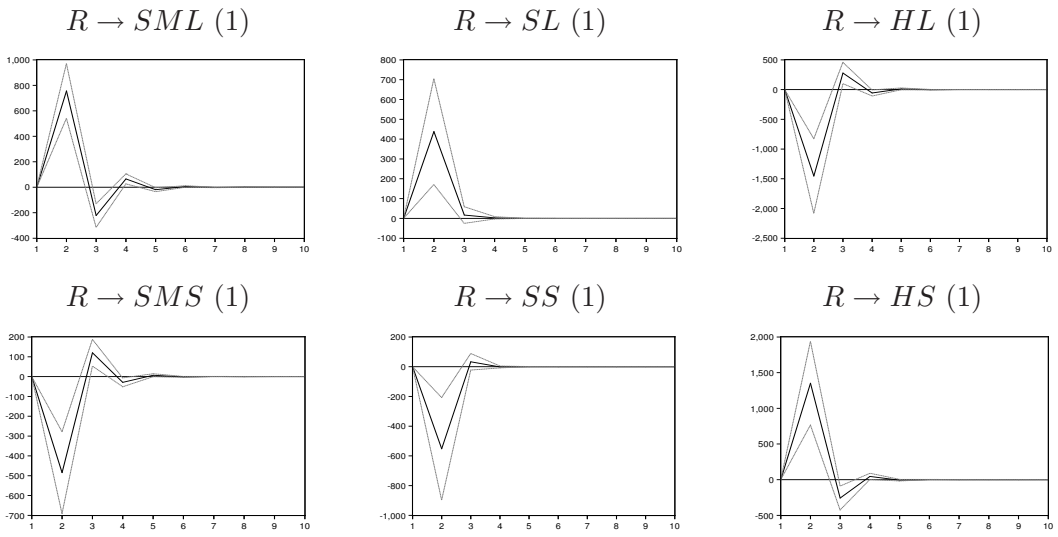

Figure 5: CHF: Effect of returns on long and short trading activity. The number of lags of the bivariate VAR models, which are determined using Akaike, Hannan-Quinn, and Schwartz information criteria, are presented in parentheses.

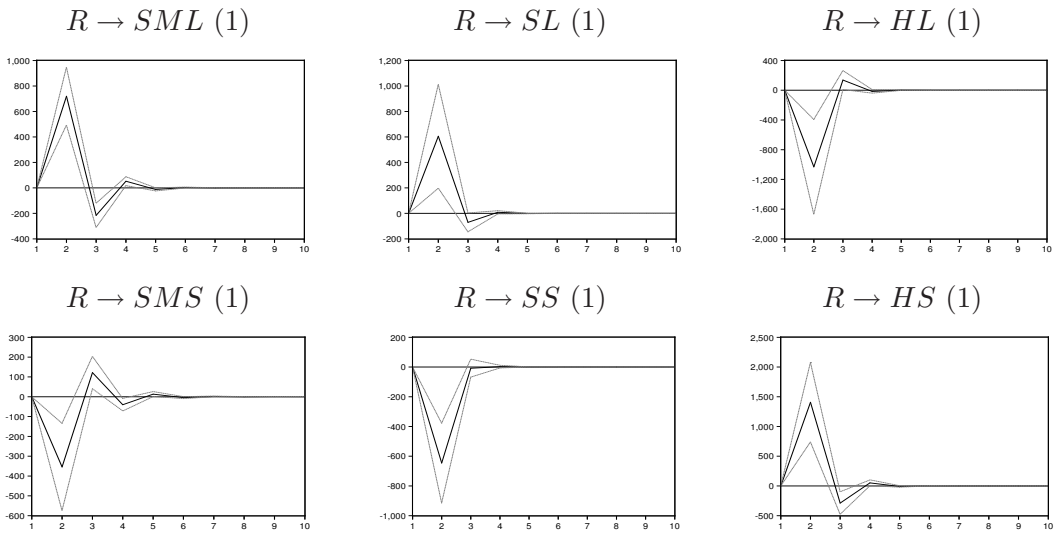

Figure 6: GBP: Effect of returns on long and short trading activity. The number of lags of the bivariate VAR models, which are determined using Akaike, Hannan-Quinn, and Schwartz information criteria, are presented in parentheses.

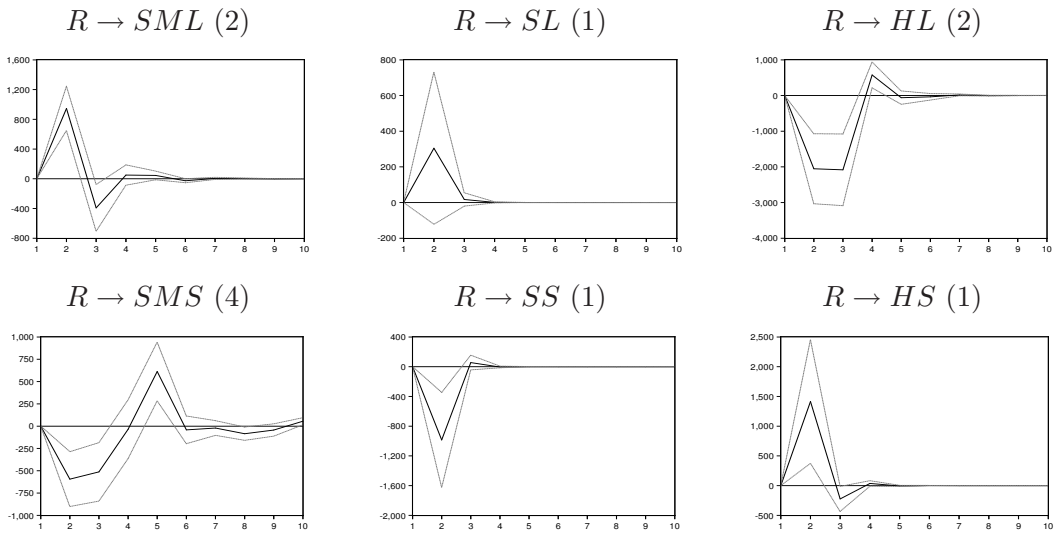

Figure 7: JPY: Effect of returns on long and short trading activity. The number of lags of the bivariate VAR models, which are determined using Akaike, Hannan-Quinn, and Schwartz information criteria, are presented in parentheses.

5 Information flows between large and small speculators

Assume, based on the previous findings, that small traders are speculators. The question of whether small speculators are less well informed than large speculators has often been raised in the literature. This section examines the information flow between large and small speculators in a lead-lag environment. Again, we formulate a hypothesis:

> *H7*: If small speculators are less well informed than large speculators, then there should be a unidirectional causality running from large speculators' positions to small speculators' positions, rather than bidirectional causality.

The results presented in Table 2 show that large speculators' activities Granger-cause small traders' positions. Table 3 shows the results for the causality running from small traders' to large speculators' positions. The findings suggest that, in the case of CAD and JPY, small traders do not influence large speculators. Hence, small traders in CAD and JPY futures markets follow the large speculators, supporting the view that information runs from large to small speculators, and not vice versa. The results for the GBP futures market are mixed. The short positions of small traders impact the short positions of large speculators. Although there is bidirectional causality, the impact of large speculators on small speculators is more significant than the effect of small speculators on large speculators. In the case of the CHF futures market, there exists bidirectional causality for both long and short positions. And, at least for the short positions, the results suggest similar levels of significance. These findings suggest that small speculators active in short CHF futures markets are not led by large speculators, and are therefore not less well informed. Summarizing, the information flow runs from large speculators to the small ones, supporting the view that small speculators are less well informed

than large speculators, except in the CHF futures market.

Table 3: Granger-causality between small traders' and speculators' positions

Pair	CAD	CHF	GBP	JPY
$SML \rightarrow SL$	0.4701	0.0142	0.1043	0.4372
$SMS \rightarrow SS$	0.3498	0.0003	0.0142	0.4805

Notes: $X \rightarrow Y$: p-value for the null hypothesis that X does not Granger-cause Y.

6 Conclusions

This study uses Granger-causality tests and vector autoregression models to examine the relations between small non-reporting traders and large speculators and hedgers in four currency futures markets. The results are based on both the causal relationships between the open positions of small traders, speculators and hedgers, and the reaction of traders' positions to futures settlement price returns. In addition, the study analyzes the information flow between large and small traders' and hence the question of whether large traders are better informed than small traders.

The findings of the paper are threefold. First, the activities of small traders in the Canadian dollar, Swiss Franc, British pound, and Japanese yen futures markets are closely related to those of the large speculators. Large speculators and small traders tend to herd, that is small traders are long [short] when large speculators are long [short] as well. In addition, long [short] hedging activity attracts small traders to open positions in short [long] futures contracts. These findings support the view that small traders are speculators. The second main finding regards the reaction of traders' positions to futures returns. The impulse responses of traders' positions to futures returns suggest that speculators and small traders are positive feedback traders whereas hedgers are contrarians. Again, these results support the

previous findings that small traders are speculators. The third main finding regards the information flows between large and small speculators. The results point to small speculators being less well informed than large speculators in the Canadian dollar, British pound, and Japanese yen futures markets. However, the bidirectional causality found in the Swiss franc futures market suggests that small traders are not per se uninformed. It is necessary to check the information flow in each individual case.

Notes

[1]Leuthold (1983, p. 113) puts it bluntly: "Without hedging, futures markets would close." This conclusion is consistent with the findings of Working (1960, p. 189) who stresses that "[...] markets [...] have died because hedgers stopped using them." See also Working (1954), Gray (1967), Adrangi and Chatrath (1998), Wang (2002b) and Chatrath, Song and Adrangi (2003).

[2]The CFTC also reports the positions of spreaders. However, spreaders frequently account for less than 1% of total open interest and are therefore omitted in this investigations.

[3]The CFTC classifies a trader's position as commercial if the trader uses the futures contracts for hedging. The CFTC Regulation 1.3(z), available at www.cftc.gov, says that "[...] no transactions or positions shall be classified as bona fide hedging unless their purpose is to offset price risks incidental to commercial cash or spot operations and such positions are established and liquidated in an orderly manner [...]". The CFTC may re-classify a trader if it obtains additional information about the trader's use of the futures contracts.

[4]See Maddala and Kim (1998) for more information on confirmatory analysis.

[5]For more information on VAR models and impulse response functions see Lütkepohl (1991) and Hamilton (1994).

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