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RESEARCH ARTICLE

MULTIHOMING USER' PREFERENCES FOR TWO-SIDED EXCHANGE NETWORKS

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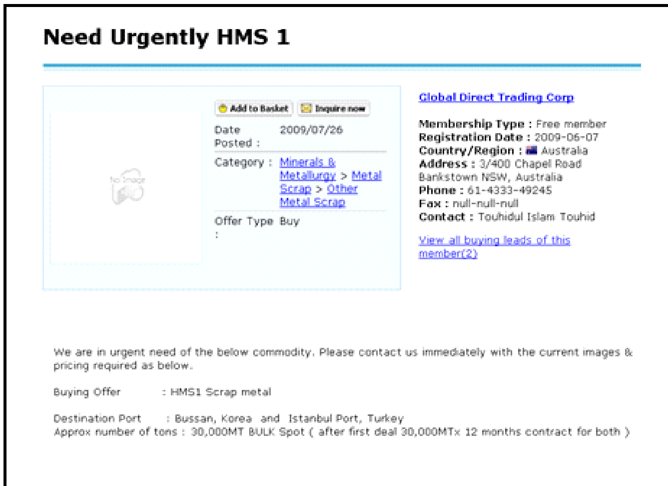
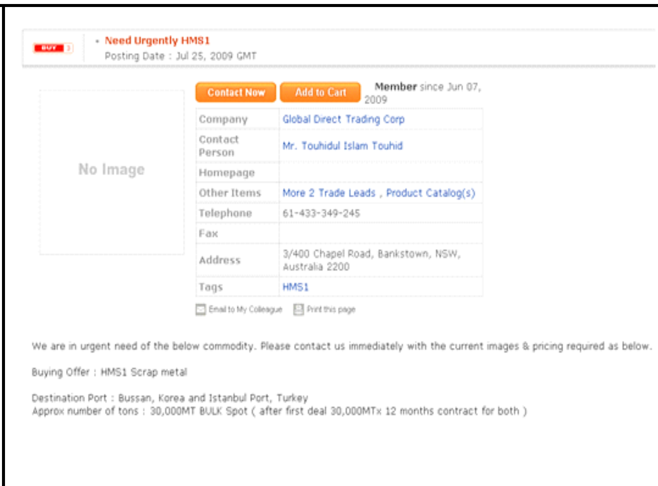
Appendix A

Sample Buying Requests

Two samples of buying leads posted on the two exchanges are presented below. We compared request details and buyer's information listed in the buying requests to identify multihoming buyers.



Buying Request in Exchange A



Buying Request in Exchange B

Appendix B

Preliminary Analyses

We estimated Equation 3 using fixed effects regression with time period dummies (*d*1, *d*2, and *d*3) (Table B1). Regression 1 is the baseline model that only includes the main effects. Results show that buyers' preferences for Exchange B were negatively related to selling activities on Exchange A ($\gamma_1 = -.11, p < .05$), but positively related to selling activities on Exchange B ($\gamma_4 = .54, p < .05$). In addition, buyers' preferences were nonlinearly related to buying activities on Exchange B ($\gamma_5 = -1.60, p < .01$; $\gamma_6 = -.66, p < .01$). These results support H1 and H3.

Next, we included interactions between time dummies and selling activities in Regression 2. Although all interactions involving selling activities on Exchange A were not significant ($p > .10$ for γ_{12}, γ_{18}, and γ_{24}), there was a significant interaction between period 1 and selling activities on Exchange B ($\gamma_{15} = -.12, p < .05$). Hence the positive relationship between selling activities in Exchange B and buyers' preferences for the exchange was stronger in the last period than it was in the first, supporting H2.

In Regression 3, we added the interactions between time dummies and buying activities to the baseline model. There were significant interactions between buying activities on Exchange B and period 2 ($\gamma_{22} = -.15, p < .05$ and $\gamma_{23} = -.20, p < .05$) and period 3 ($\gamma_{28} = -.07, p < .10$ and $\gamma_{29} = -.24, p < .05$). These estimates indicate that the absolute value of $(\log(Buying^{B}_{-i,t}))^2$, which represents the rate of change in buyers' preferences for Exchange B with respect to buying activities in that exchange, was the least in the last time period, supporting H4. The non-significant interactions between period 1 and buying activity levels in Exchange B suggest a possibility of nonlinear time trend, which we accounted for in the main analysis by using a quadratic time trend specification.

We then estimated a model that includes all the interactions between time dummies and activity levels in Regression 4. The results are qualitatively similar to those we found above, with one exception. The interaction between period 1 and selling activities on Exchange B was only marginally positive ($\gamma_{15} = -.12, p < .10$).

Next, we examined a dynamic model with a lagged dependent variable as regressor. This specification addresses the concern that multihoming buyers' usage of the exchanges over time might be path-dependent, where their preferences in the previous time period could affect their current preference. We estimated this specification using the one-step system generalized method-of-moments (GMM) estimator with robust standard errors. GMM estimation is appropriate in our context due to our "large *N,* small *T*" panel, where we have a large number of buyers but each buyer was observed only a few times (Roodman 2009). However, the use of a lagged dependent variable as regressor limited our sample to observations in the last three time periods.

GMM used the lagged values of all variables in our model as instruments. Table B2 presents the dynamic model results, which show that buyers' preferences in the previous time period did not significantly affect their current preferences ($\gamma_{23} = -.12, p > .10$). Both Sargan and Hansen tests of over-identification were not rejected, indicating that the instruments were suitable. Furthermore, the Arellano-Bond test failed to reject the null hypothesis of no autocorrelation.

Based on these preliminary results, we decided to use a static model with quadratic time trend function in our main analysis. This specification allows us to use all the observations in our sample in our estimations, and to account for a possible nonlinear time trend.

Reference

Roodman, D. 2009. "How to Do xtabond2: An Introduction to Difference and System GMM in Stata," *The Stata Journal* (9:1), pp.86-136.

Table B1. Preliminary Results (Estimations of Equation 3 Using Time Period Dummy)

DV: $Pref^{B}_{i,t}$	Regression 1	Regression 2	Regression 3	Regression 4
	Coeff.	Coeff.	Coeff.	Coeff.
γ_0: *Constant*	.33* (0.18)	0.39* (0.19)	0.40* (0.19)	0.41* (0.20)
γ_1: $\log(Selling^{A}_{t})$	-0.11* (0.05)	-0.11* (0.06)	-0.10^{+} (0.06)	-0.11* (0.06)
γ_2: $\log(Buying^{A}_{-i,t})$	0.02 (0.24)	0.04 (0.26)	-0.06 (0.29)	-0.04 (0.29)
γ_3: $(\log(Buying^{A}_{-i,t}))^2$	0.02 (0.09)	0.04 (0.09)	0.00 (0.11)	0.01 (0.12)
γ_4: $\log(Selling^{B}_{t})$	0.54* (0.26)	0.39 (0.27)	0.68* (0.28)	0.52^{+} (0.29)
γ_5: $\log(Buying^{B}_{-i,t})$	-1.60** (0.55)	-1.57** (0.55)	-2.52** (0.82)	-2.18** (0.78)
γ_6: $(\log(Buying^{B}_{-i,t}))^2$	-0.66** (0.23)	-0.66** (0.23)	-0.96** (0.30)	-0.76* (0.29)
γ_7: $\log(Paid^{A}_{t})$	-0.08^{+} (0.04)	-0.07^{+} (0.04)	-0.06 (0.04)	-0.06 (0.04)
γ_8: $\log(Paid^{B}_{t})$	-0.15 (0.12)	-0.21 (0.13)	-0.15 (0.11)	-0.20 (0.12)
γ_9: $d1$	0.00 (0.04)	-0.01 (0.04)	0.01 (0.05)	0.01 (0.05)
γ_{10}: $d2$	-0.01 (0.03)	-0.01 (0.03)	0.03 (0.02)	0.04 (0.03)
γ_{11}: $d3$	-0.01 (0.02)	-0.01 (0.02)	0.04* (0.02)	0.05* (0.02)
γ_{12}: $d1 \cdot \log(Selling^{A}_{-i,t})$		0.01 (0.02)		0.02 (0.03)
γ_{13}: $d1 \cdot \log(Buying^{A}_{-i,t})$			-0.03 (0.04)	-0.05 (0.05)
γ_{14}: $d1 \cdot (\log(Buying^{A}_{-i,t}))^2$			-0.03 (0.03)	-0.03 (0.03)
γ_{15}: $d1 \cdot \log(Selling^{B}_{-i,t})$		-0.12* (0.06)		-0.12^{+} (0.07)
γ_{16}: $d1 \cdot \log(Buying^{B}_{-i,t})$			-0.17^{+} (0.09)	-0.09 (0.07)
γ_{17}: $d1 \cdot (\log(Buying^{B}_{-i,t}))^2$			-0.15 (0.12)	-0.18 (0.13)
γ_{18}: $d2 \cdot \log(Selling^{A}_{-i,t})$		-0.01 (0.02)		-0.01 (0.02)
γ_{19}: $d2 \cdot \log(Buying^{A}_{-i,t})$			-0.03 (0.04)	-0.03 (0.04)
γ_{20}: $d2 \cdot (\log(Buying^{A}_{-i,t}))^2$			-0.05 (0.03)	-0.05 (0.03)
γ_{21}: $d2 \cdot \log(Selling^{B}_{-i,t})$		-0.10 (0.07)		-0.10 (0.08)
γ_{22}: $d2 \cdot \log(Buying^{B}_{-i,t})$			-0.15** (0.05)	-0.12* (0.05)
γ_{23}: $d2 \cdot (\log(Buying^{B}_{-i,t}))^2$			-0.20** (0.07)	-0.26* (0.11)
γ_{24}: $d3 \cdot \log(Selling^{A}_{-i,t})$		-0.01 (0.02)		0.00 (0.02)
γ_{25}: $d3 \cdot \log(Buying^{A}_{-i,t})$			-0.03 (0.03)	-0.03 (0.03)
γ_{26}: $d3 \cdot (\log(Buying^{A}_{-i,t}))^2$			-0.03 (0.03)	-0.03 (0.03)
γ_{27}: $d3 \cdot \log(Selling^{B}_{-i,t})$		0.00 (0.05)		-0.03 (0.05)
γ_{28}: $d3 \cdot \log(Buying^{B}_{-i,t})$			-0.07^{+} (0.04)	-0.05 (0.03)
γ_{29}: $d3 \cdot (\log(Buying^{B}_{-i,t}))^2$			-0.24* (0.09)	-0.26* (0.10)
R^2	.07	.10	.12	0.14

N = 472. We estimated the models using fixed effects transformation, where we time-demeaned data for each buyer. Robust standard errors in parenthesis.

$^{+}p < .10$; $^{*}p < .05$; $^{**}p < .01$; $^{***}p < .001$.

Table B2. Preliminary Results (GMM Estimations with Lagged Dependent Variable)	
DV: $Pref^{B}_{i,t}$	Regression 1
	Coeff.
γ_0: *Constant*	0.75^{+} (0.43)
γ_1: $\log(Selling^{A}_{t})$	-0.35* (0.17)
γ_2: $\log(Buying^{A}_{-i,t})$	-0.16 (0.45)
γ_3: $(\log(Buying^{A}_{-i,t}))^2$	-0.22 (0.16)
γ_4: $\log(Selling^{B}_{t})$	0.60 (0.77)
γ_5: $\log(Buying^{B}_{-i,t})$	-1.65 (1.53)
γ_6: $(\log(Buying^{B}_{-i,t}))^2$	-0.98 (0.85)
γ_7: $\log(Paid^{A}_{t})$	-0.07 (0.05)
γ_8: $\log(Paid^{B}_{t})$	-0.36 (0.31)
γ_9: $d2$	0.06 (0.04)
γ_{10}: $d3$	0.07* (0.03)
γ_{11} $d2 \cdot \log(Selling^{A}_{-i,t})$	0.00 (0.03)
γ_{12}: $d2 \cdot \log(Buying^{A}_{-i,t})$	-0.06 (0.04)
γ_{13}: $d2 \cdot (\log(Buying^{A}_{-i,t}))^2$	-0.05 (0.03)
γ_{14}: $d2 \cdot \log(Selling^{B}_{-i,t})$	-0.13 (0.10)
γ_{15}: $d2 \cdot \log(Buying^{B}_{-i,t})$	-0.11 (0.08)
γ_{16}: $d2 \cdot (\log(Buying^{B}_{-i,t}))^2$	-0.28* (0.12)
γ_{17}: $d3 \cdot \log(Selling^{A}_{-i,t})$	-0.01 (0.02)
γ_{18}: $d3 \cdot \log(Buying^{A}_{-i,t})$	-0.03 (0.03)
γ_{19}: $d3 \cdot (\log(Buying^{A}_{-i,t}))^2$	-0.03 (0.03)
γ_{20}: $d3 \cdot \log(Selling^{B}_{-i,t})$	-0.05 (0.06)
γ_{21}: $d3 \cdot \log(Buying^{B}_{-i,t})$	-0.07 (0.04)
γ_{22}: $d3 \cdot (\log(Buying^{B}_{-i,t}))^2$	-0.32** (0.11)
γ_{23}: $\log(Pref^{B}_{i,t-1})$	-0.12 (0.22)
Arellano-Bond test for AR(1) in first differences	z = -0.86 ($p > .10$)
Sargan test of over-identifying restrictions	$\chi^2 = 29.46$ ($p > .10$)
Hansen test of over-identifying restrictions	$\chi^2 = 13.96$ ($p > .10$)

N = 354. Robust standard errors in parenthesis.
118 first-period observations were dropped due to the creation of the lagged dependent variable $\log(Pref^{B}_{t-1})$
$^{+}p < .10$; $^{*}p < .05$; $^{**}p < .01$; $^{***}p < .001$.