Asymmetric Information and the Forex Spreads of Custody Banks

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Custody Banks: Headache Relief

- Custody banks
  - Hold and administer assets of institutional investors
    - Safeguard securities
    - Settle trades
    - Invest funds as directed
    - Collect income (dividends, interest)
    - Prepare reports: Asset and portfolio values, Trading activity
- Industry assets under management ~$100 tn
  - Top 15 banks hold $80 trillion world wide (2007, *Inst. Inv*)
- Global Custody Banks
  - Manage international assets
    - Top 15 banks hold $37 trillion international assets
  - Hire own foreign-exchange dealers

FX Trades with Custodians

- Custodians make markets for clients in FX
  - When client gives order to trade foreign assets
    - Normally: Instruction to trader comes from 'fund accountant'
    - Sometimes: Client calls traders directly, negotiates price
      - As in regular OTC market
  - When client receives income: Dividends, coupons, interest
    - "Standing orders" from clients: Repatriate automatically
    - Instruction to trader comes from 'fund accountant'
- Usually, clients learn trade info in regular reports
  - Unless direct call with negotiated price
  - Headache relief: Clients reduce administrative burden

Asymmetric Information

- Asymmetric Information
  - Custodian knows its prices, margins
  - Clients know very little
  - Began as historical accident
    - By-product of headache relief
    - Plus state of technology back then
- Reduce admin burden? Hard to monitor execution quality
  - Client funds don't know
    - Bid-ask spread
    - Time of trades
    - What's a 'normal' custodial execution cost
  - Data on prices, dates, scattered in various reports

Asymmetric Info. and Custody Margins

- **Fog: Wider custody margins when clients know less**
  - Extension of "market power hypothesis"
    - For muni bond market (Green et al. 2007)
  - Clients who know less about normal spreads, current conditions …
    - Have less bargaining power vis-à-vis dealers
    - Pay wider spreads

- **Ambiguity maintenance: Prices to protect uncertainty re margins**
  - Suppose clients know 6% bid-ask spread usually unreasonable
    - If price over 3% beyond day's range, clients infer worst
  - Implies smaller custodial margin when
    - Wider interbank spread
    - Sub-custodian involved in trade

Asymmetric Info. and Custody Margins

- Two asymmetric information effects specific to custody trades
  - Fog: Wider margins when customers know least
  - Ambiguity maintenance: Margins set at max ambiguity-consistent
  - Information = Execution costs
- Asymmetric information already key to understanding spreads
  - Adverse selection
    - Wider bid-ask spreads for informed customers
    - Info = Asset's true value
  - Strategic dealing
    - Narrower bid-ask spreads for informed customers
    - Info = Asset's true value
  - Market power
    - Narrower bid-ask spreads for informed customers
    - Info = Normal spreads, Current market conditions

Outline

- Data
- Methodology
- Results

Data

- Complete forex record, 2006, mid-sized custody bank
  - Detailed information for each transaction
    - Amount traded, Transaction price
    - Time transaction requested, time carried out
    - Purpose of transaction
    - Custody bank's income from transaction in USD
    - Nature of asset manager: Trust fund or Institutional investor?
    - NAV of asset manager, end 2006

Data

- Sample
  - 75,000-125,000 transactions
  - 27 currencies
  - $50-$100 billion aggregate value
- Transactions often aggregated into larger 'trade'
  - We identify clusters of transactions
    - Same currency, price, time
      - Time within 5 minutes
  - Clusters of transactions ≡ "trades"
  - ~ 25,000 trades

Data

	Asset Allocation	Income-Repatriation
Shares		
Non-Negotiated	75%	22%
Negotiated	3%	–
Average Trade Size		
Non-Negotiated	$1.8	$0.6
Negotiated	$2.8	–
Average Margin		
Non-Negotiated	22.4	23.3
Negotiated	3.4	–

Outline

- Data ✓
- Methodology
- Results

Methodology: Regression

$$Margin_t = \alpha + \beta F_t + \gamma AM_t + \delta X_t + \eta_t$$

- $Margin_t$ = Margin of trade t (in bps)
- F_t = Fog effect variables for trade t
- AM_t = Ambiguity maintenance variables
- X_t = Control variables
- η_t = Residuals

Custody Margins: Determinants

$$Margin_t = \alpha + \beta F_t + \gamma AM_t + \delta X_t + \eta_t$$

- F_t – Fog Effect — Expect
  - Baseline trade = Negotiated (called in directly)
  - Dummy for non-negotiated asset-allocation trades +
  - Dummy for income trades +

Custody Margins: Determinants

- Ambiguity Maintenance
  - Asset manager can be confident price is unreasonable if pays more than

    Day's High(1 + *x*%)

  - Maximum bid-ask spread paid by asset managers

    MaxSpread = Avg Log(High/Low) + 2*x*%

  - Maximum custody-bank spread is thus

    Avg Log(High/Low) + 2*x*%

    – Interbank Spread

    – Sub-Custodian Margin (if any)

Custody Margins: Determinants

$$Margin_t = \alpha + \beta F_t + \gamma AM_t + \delta X_t + \eta_t$$

- AM_t: Ambiguity Maintenance — Expect
  - Currency realized volatility
    - Average over 2006 relative to other currencies: +
    - 5-day volatility relative to own average in 2006: +
  - Interbank spread: –
  - Dummy for sub-custodian involvement: –

Custody Margins: Determinants

$$Margin_t = \alpha + \beta F_t + \gamma AM_t + \delta X_t + \eta_t$$

- X_t – Controls — Expect
  - Fund size: Attract business of active clients
    - (Log) NAV end 2006 — –
    - Volume of trades — –
  - Trade size — ?
    - Adverse selection (+)?
      - But these dealers discouraged from speculating
    - Strategic dealing (–)?
      - But if dealers don't speculate, don't value information
  - Market liquidity
    - Currency market share (BIS 2007) — –
    - Day-of-week dummies: Friday has low liquidity — +

Outline

- Data ✓
- Methodology ✓
- Results

Results: Support Fog Effect

- Independent variable: Trade margin (basis points)

		27 Countries
F (+)	Non-negotiated Allocation	19.6***
F (+)	Income Repatriation	20.0***
AM (+)	Cross-Sec Volatility	11.7***
AM (+)	Time-Series Volatility	2.7***
AM (–)	Interbank Half-Spread	0.03***
AM (–)	Sub-Custodian	-11.0***
C (–)	(Log) Fund NAV	-0.1***
C (–)	Fund Trading Volume	-0.5***
C (–)	(Log) Market Liquidity	-0.7**
C (+)	Friday Dummy	1.7***
C (?)	(Log) Trade Value	0.1
C (?)	Constant	-10.0***

Results: Support Ambiguity Maintenance

- Independent variable: Trade margin (basis points)

		27 Countries
F (+)	Non-negotiated Allocation	19.6***
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Results: Support Existing Theory

- Independent variable: Trade margin (basis points)

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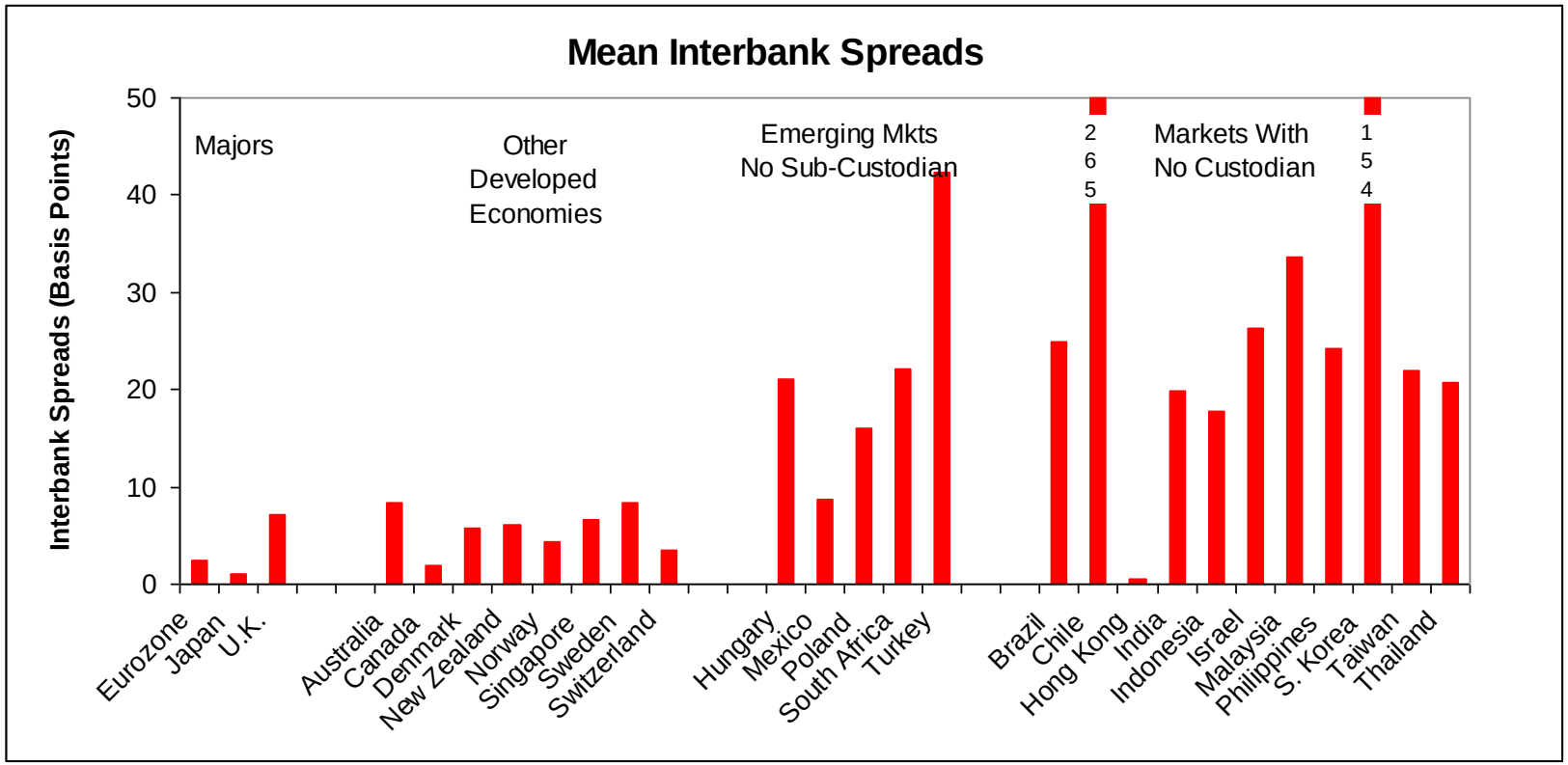
Data

- Interbank spreads suspiciously large for Chile and South Korea
  - **Difference, *daily price from oanda.com (daily average ask) minus daily price from Global Insight (daily average midquote)***



Results: Support Existing Theory

- Intbk ½-sprd effect negative when exclude Chile & S. Korea

		27 Countries	25 Countries
F (+)	Non-negotiated Allocation	19.6***	20.0***
F (+)	Income Repatriation	20.0***	20.6***
AM (+)	Cross-Sec Volatility	11.7***	12.4***
AM (+)	Time-Series Volatility	2.7***	2.5***
AM (–)	Interbank Half-Spread	0.03***	-0.1*
AM (–)	Sub-Custodian	-11.0***	-11.2***
C (–)	(Log) Fund NAV	- 0.1***	-0.1*
C (–)	Fund Trading Volume	-0.5***	-0.5***
C (–)	(Log) Market Liquidity	-0.7**	-1.3**
C (+)	Friday Dummy	1.7***	2.0***
C (?)	(Log) Trade Value	0.1	0.2
C (?)	Constant	-10.0***	-12.4***

Fog Effect Robust

- Censored regressions using only trades with positive margins
- Add fund dummies
  - Funds choose combinations of fees, margins
  - Maybe scope of fund-custodian relationship matters

		25 Countries	Censored (Marg Effects)	Fund Dummies
F (+)	Non-negotiated Allocation	20.0***	20.4***	19.4***
F (+)	Income Repatriation	20.6***	21.0***	21.2***
AM (+)	Cross-Sec Volatility	12.4***	12.4***	12.0***
AM (+)	Time-Series Volatility	2.5***	2.5***	2.5***
AM (–)	Interbank Half-Spread	-0.1*	-0.1	-0.1
AM (–)	Sub-Custodian	-11.2***	-11.1***	-10.4***

Custody Spreads on Forex Trades

- Asymmetric information and forex custody spreads
- Forex trades of mid-sized custody bank, 2006
- **Fog**: Margins DO widen when customers know least about execution costs
- **Ambiguity maintenance**: Margins DO narrow apparently to protect uncertainty
  - Rise with currency volatility
  - Decline with sub-custodian involvement

Fog Effect Robust

- Maybe funds that call dealers directly are just treated differently
  - Limit sample to funds that make direct trades
  - All results include fund dummies, 25 countries

		All Funds	Funds that Call Directly
F (+)	Non-negotiated Allocation	19.4***	19.7***
F (+)	Income Repatriation	21.2***	20.7***
AM (+)	Cross-Sec Volatility	12.0***	11.9***
AM (+)	Time-Series Volatility	2.5***	2.9***
AM (–)	Interbank Half-Spread	-0.1	-0.2**
AM (–)	Sub-Custodian	-10.4***	-9.8***

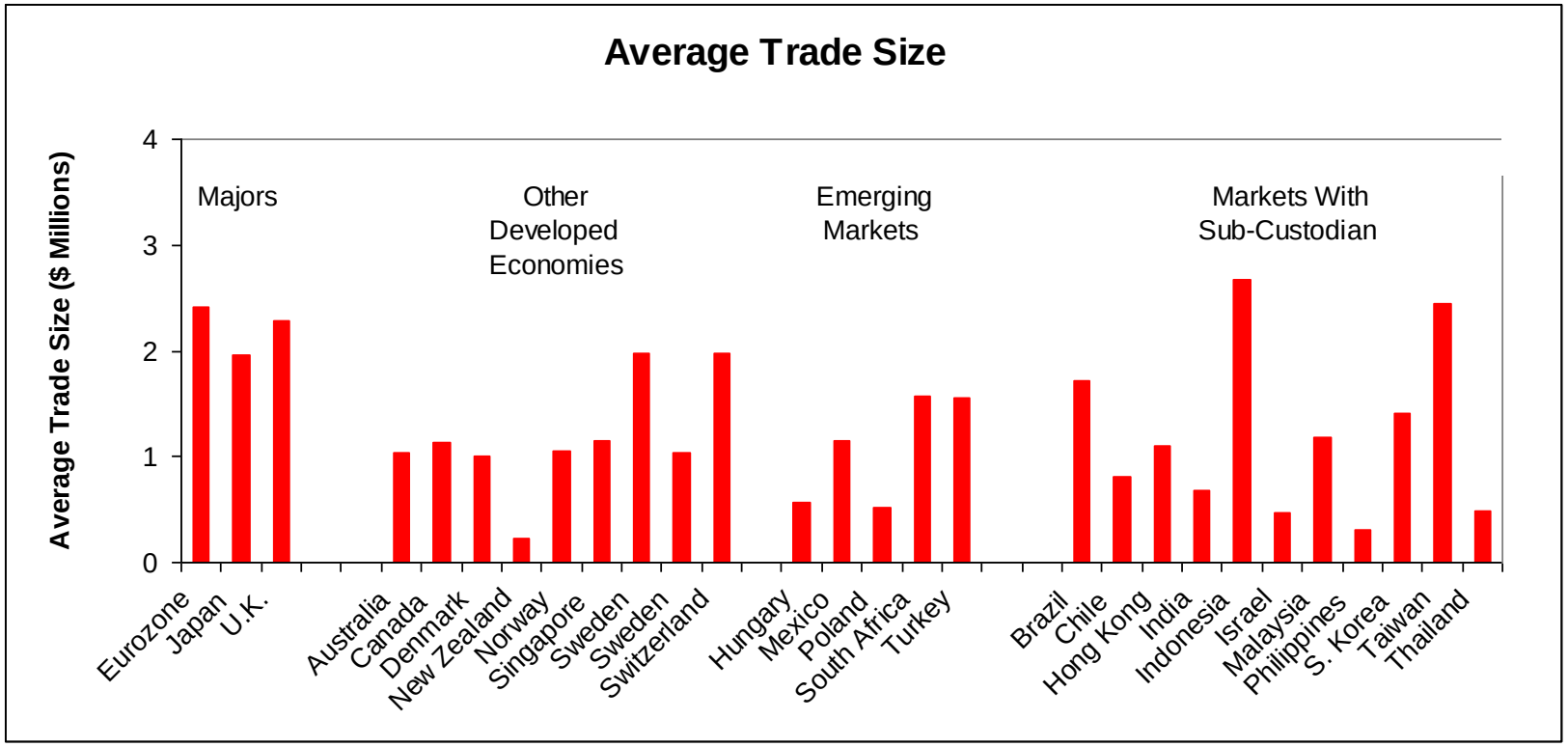
Fog Effect Robust

- Maybe it differs for very liquid or emerging-market currencies
  - All regressions include fund dummies
  - One noticeable difference: Income trades

		25 Currencies	Most Liquid Currencies	Emerging-Market Currencies
F (+)	Non-negotiated Allocation	19.4***	23.7***	15.8***
F (+)	Income Repatriation	21.2***	27.2***	10.3***
AM (+)	Cross-Sec Volatility	12.0***	14.6***	10.7***
AM (+)	Time-Series Volatility	2.5***	1.0***	4.0***
AM (–)	Interbank Half-Spread	-0.1	-0.1	-0.4** *
AM (–)	Sub-Custodian	-10.4***	NA	-11.6***

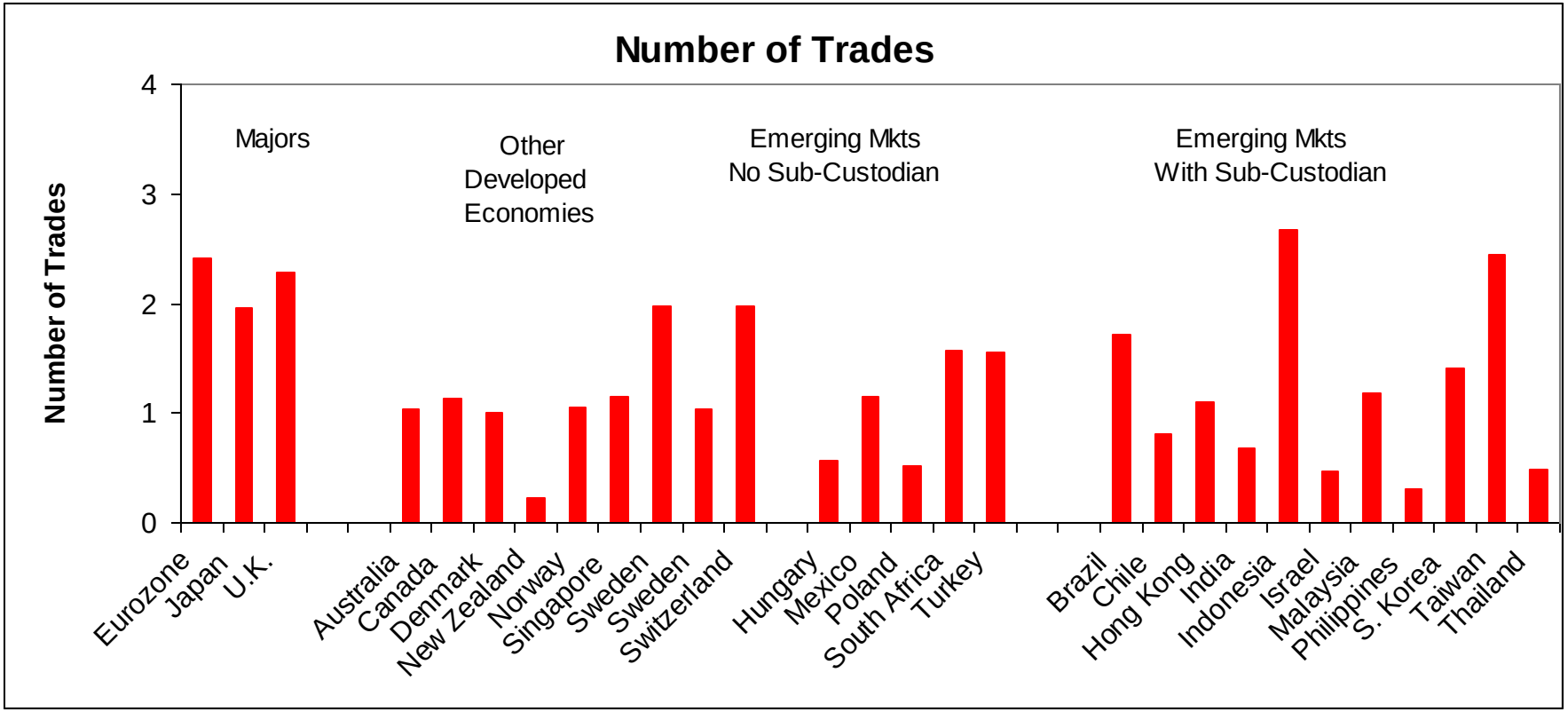
Data

- Average trade size (basis points)

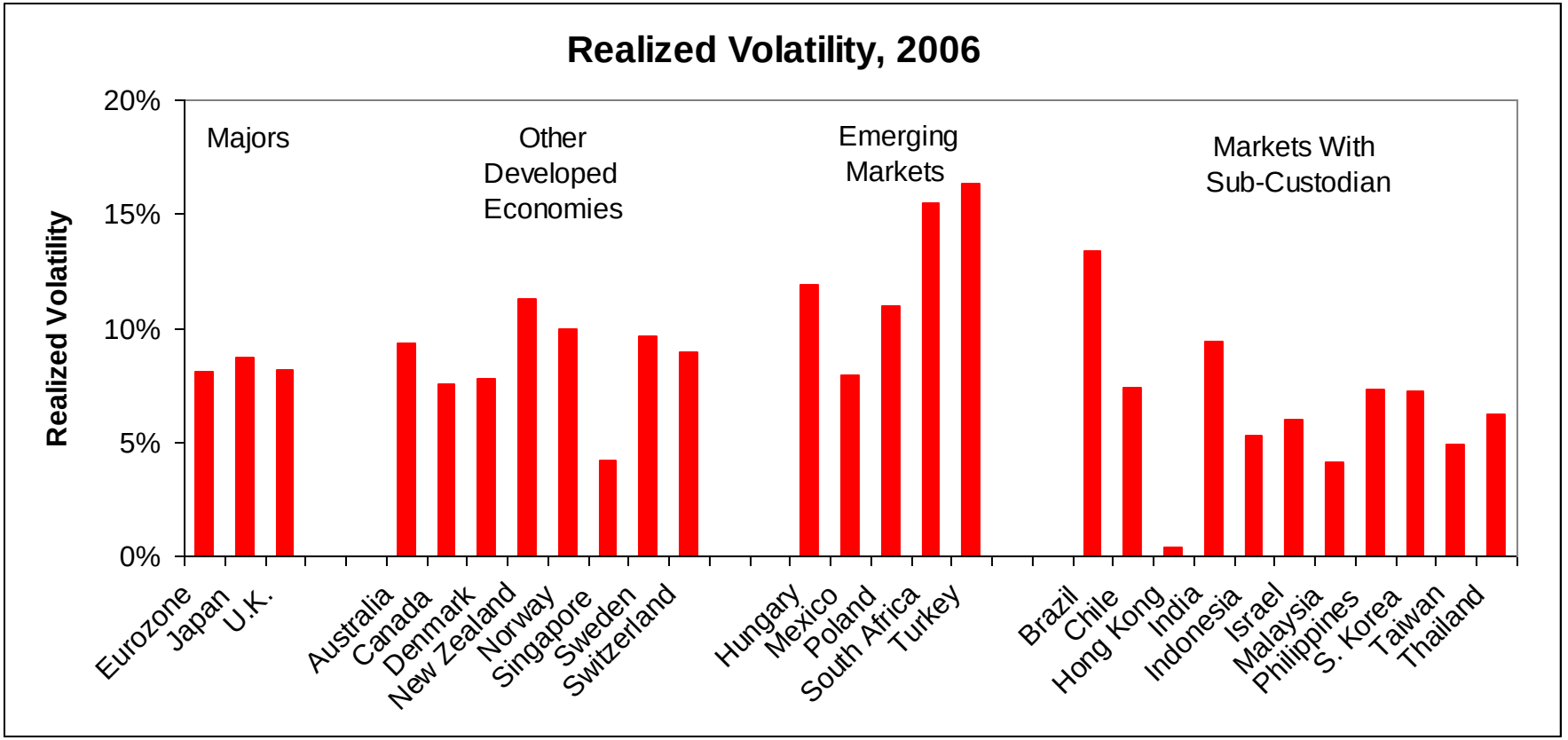


Data

- Number of Trades

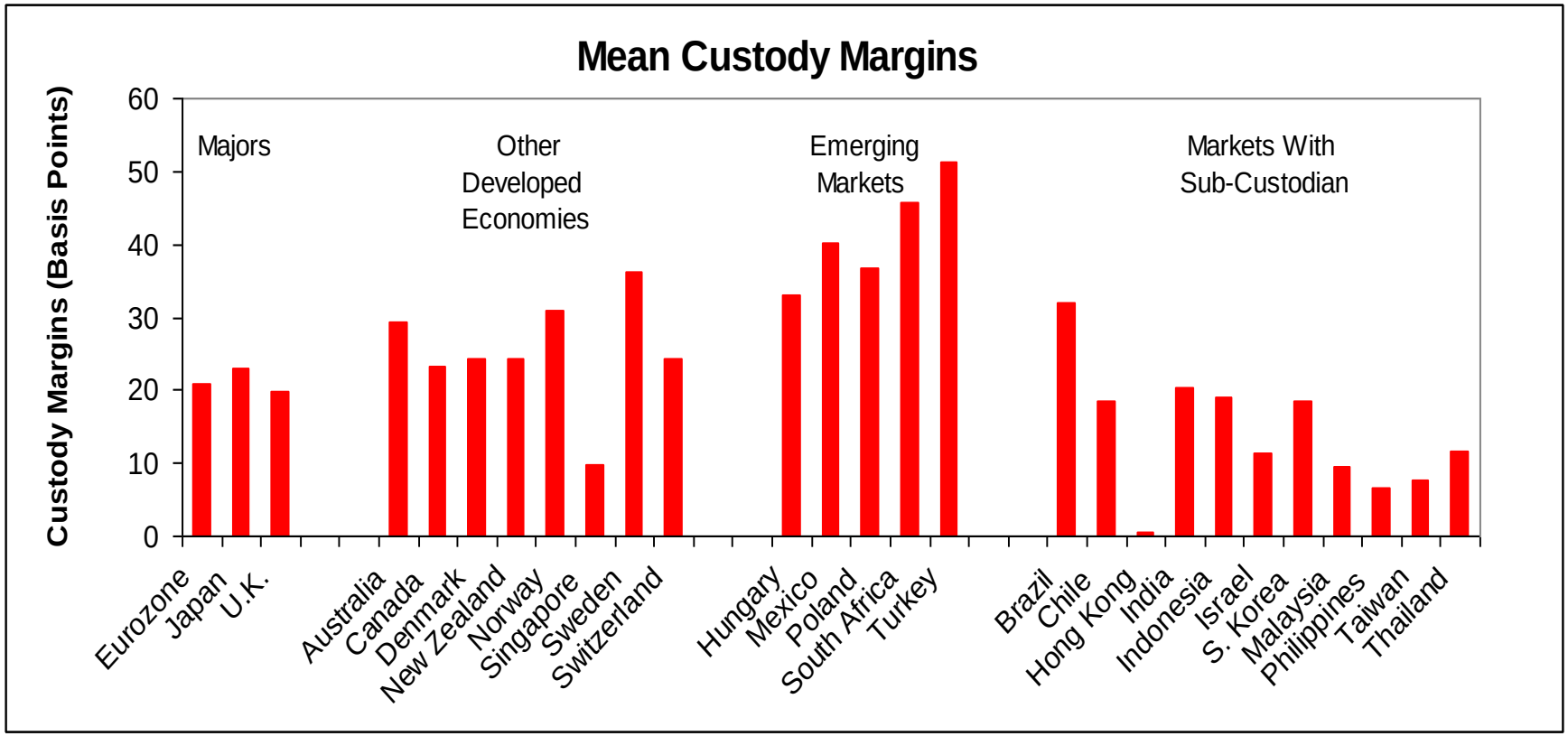


Data


Realized Volatility, 2006
Realized Volatility
20%
15%
10%
5%
0%
Majors
Other Developed Economies
Emerging Markets
Markets With Sub-Custodian
Eurozone
Japan
U.K.
Australia
Canada
Denmark
New Zealand
Norway
Singapore
Sweden
Switzerland
Hungary
Mexico
Poland
South Africa
Turkey
Brazil
Chile
Hong Kong
India
Indonesia
Israel
Malaysia
Philippines
S. Korea
Taiwan
Thailand

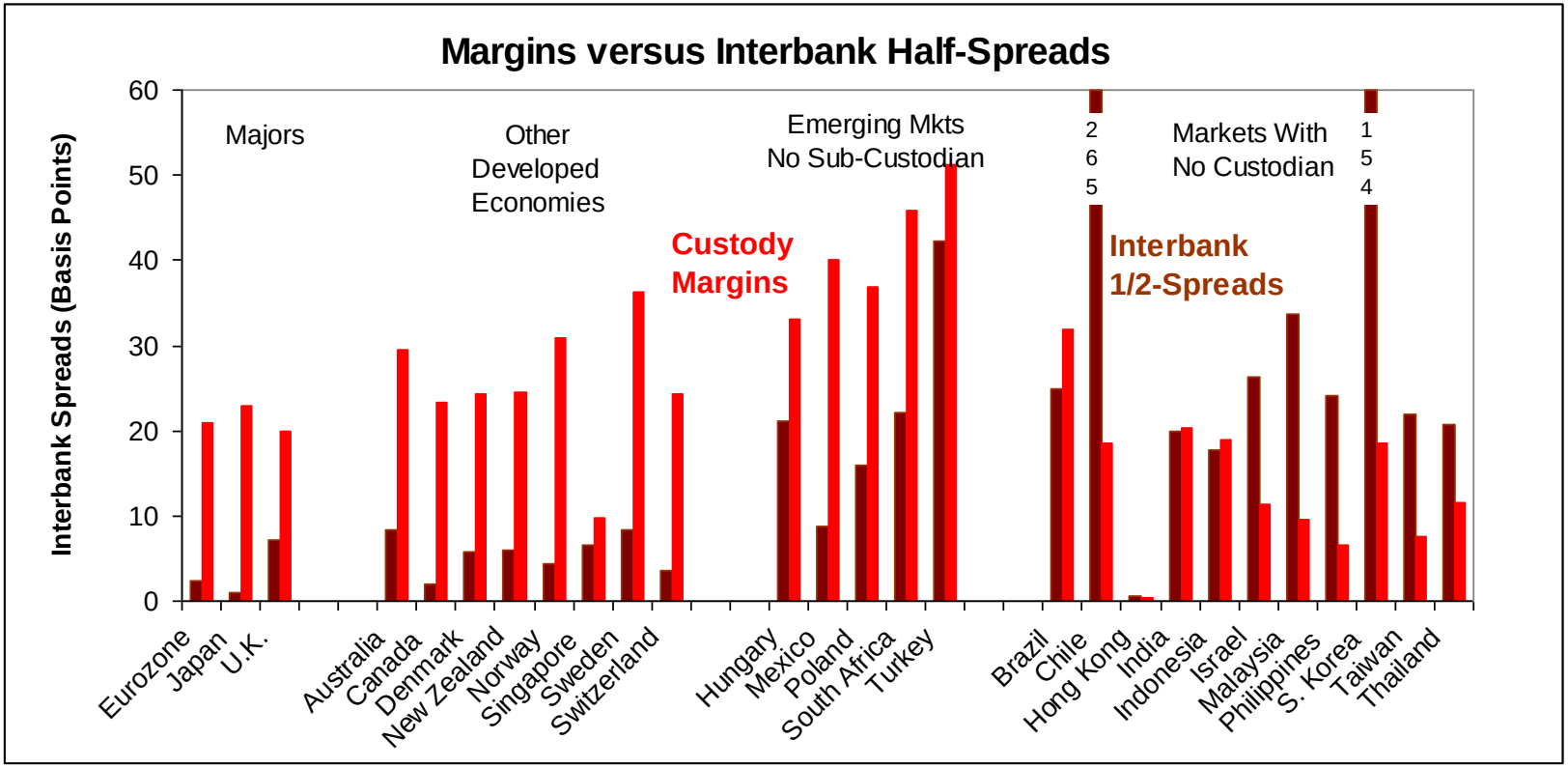
Data

- Average custodian margins (basis points)
  - Note: Markets with sub-custodians; Hong Kong



Data

- Custody margins versus Interbank half-spreads
  - *Difference, daily price from oanda.com (daily average ask) minus daily price from Global Insight (daily average midquote)*



Descriptive Statistics

Variable	Mean	Std. Dev.
Margin (basis points)	20.8	49.3
Fund NAV	$1.6 billion	$3.4 billion
Log Fund NAV	4.8	3.9
Interbank Half-Spread	28.7	55.5
Cross-Sec Volatility	0.8	0.6
Time-SeriesVolatility	1.0	1.0
(Log) Market Liquidity	-3.6	1.8
Trade Value	$1.7 million	$6.8 million
Log Trade Value	12.3	2.4

Measuring RHS Variables: Details

- Dependent Variables

Fog

+ **Trade type dummies**: Baseline = Direct asset-allocation trade
  + D1: Indirect Allocation = 1; D2: Income Repatriation = 1

Ambiguity Maintenance

+ **Cross-Section Average 2006 volatility**
  + Currency's realized daily volatility/(Unweighted) average volatility
+ **(Time-Series) volatility**: 5-day realized volatility/currency's 2006 average realized volatility
– **Average 2006 interbank spread**: In basis pts
  - 2*10,000*[Avg wkdy ask– avg wkdy mid-pt]/Avg wkdy mid-pt
  - Wkdy ask: www.oanda.com; Wkdy midquotes: Global Insight
– **Dummy, subcustodian involved** = 1

Controls

– **(Log) Fund NAV**: USD, end 2006
– **Fund's trade volume with custody bank**
– **(Log) Market liquidity**: Currency's share of world trading (BIS 2007)
+ Day-of-week dummies
? **(Log) Trade amount**: USD