

# Why do listed firms pay for market making in their own stock?

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- Designated Market Makers (DMM) at Oslo Stock Exchange
- DMM (brokerage house/bank) hired by the firm, annual fee
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## **Contribution:**

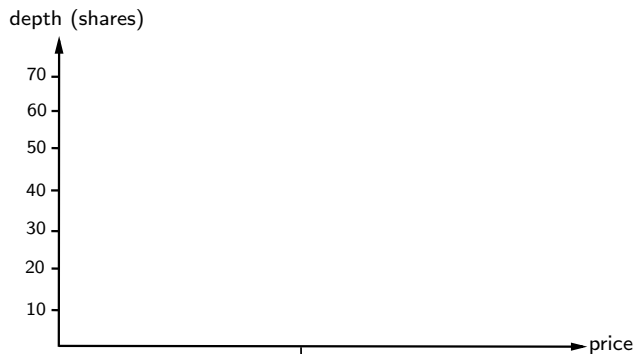
- earlier studies, effect on market price and liquidity
- we look at DMMs from the *firm's perspective*, what determines the hiring choice?

# Overview of presentation

- 1 Stock market liquidity
- 2 Question and motivation
- 3 Related literature
- 4 Data
- 5 Results
  - Why improve liquidity?
  - Asset pricing implications
- 6 Conclusion

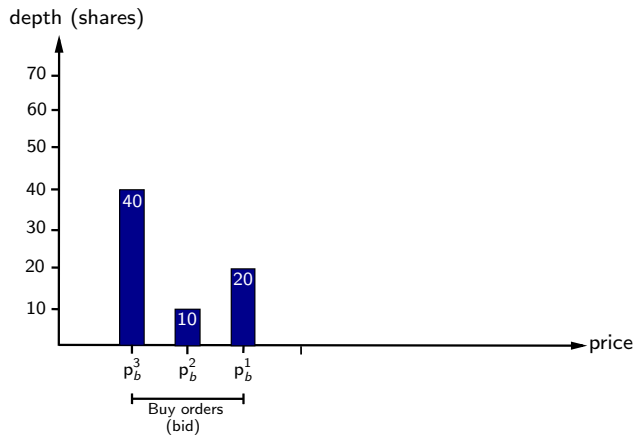
# Liquidity example - limit order market

Snapshot of a limit order book for a stock



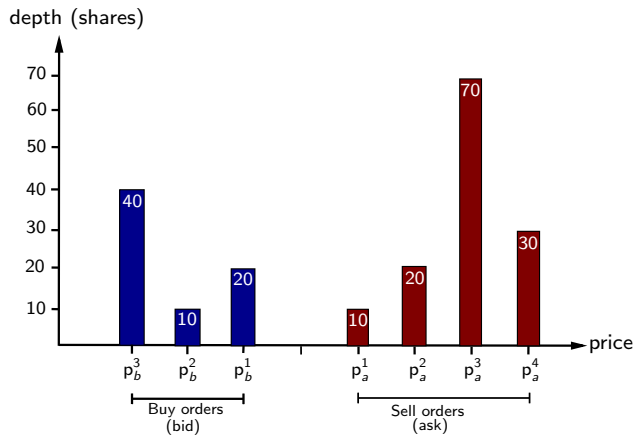
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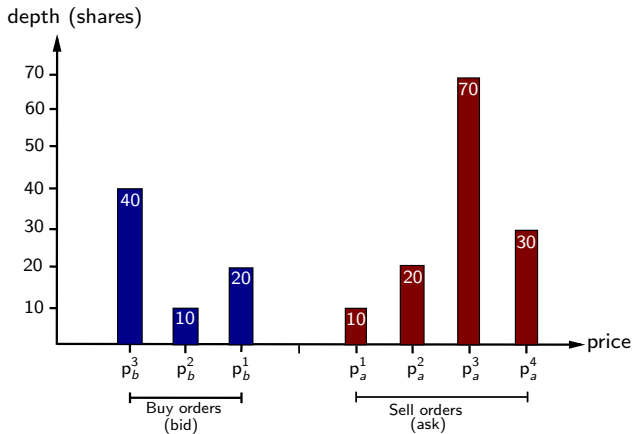
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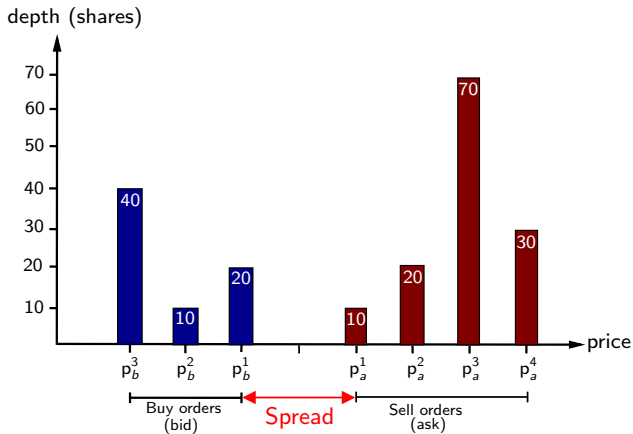
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Liquidity supply

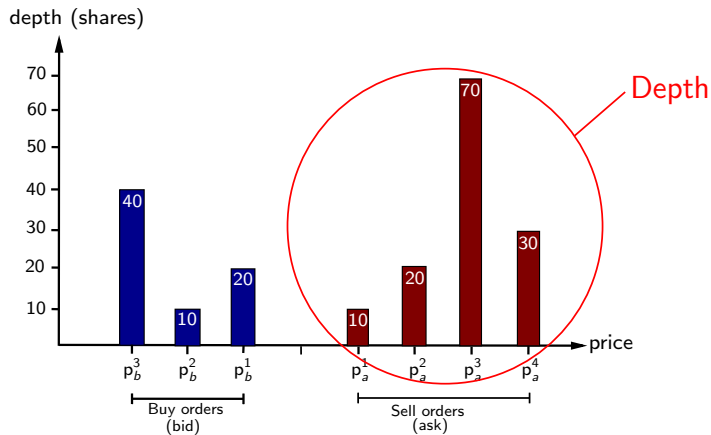
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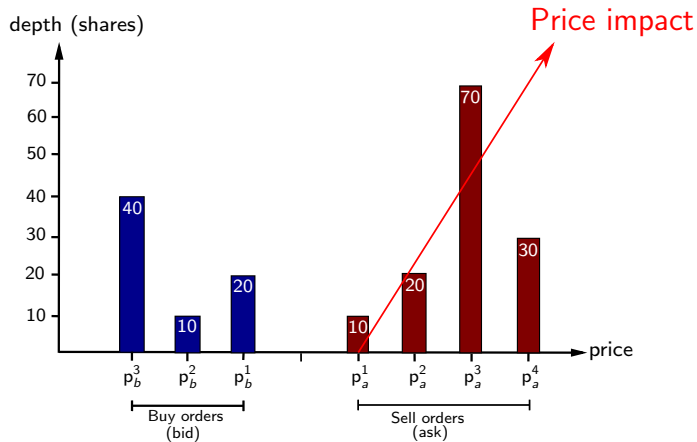
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## Evolution towards electronic Limit Order Markets

- **no** market makers, liquidity supplied by patient traders
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- listed firms can hire a financial intermediary (DMM) to provide liquidity in its stock.
- **typical contract**
  - practice market making at least 85% of the time
  - maximum bid/ask spread of 4%
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**Prior research:** When firms hire a DMM, liquidity improves.

- ..but that is what the DMM is paid to do.
- this paper: *why* do firms pay to improve market liquidity?

## Previous studies $\Rightarrow$ Value of firm increases

- initially, DMM should not affect firms operations.
- having a DMM is costly:  $V = (X - c^{DMM})/r$
- increase in  $V$  must come from effect on  $X$ ,  $r$  or both

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## Potential effects on cash flow ( $X$ )

- reduced equity issuance costs (fees) [Butler et.al, 2005]
- lower direct cost of debt issuance [Butler/Wan, 2010]
- lower costs of stock repurchases [Brockman et.al, 2008]

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## Potential effect on discount rate ( $r$ )

- liquidity risk priced [e.g. Pastor/Stambaugh (2003), Acharya/Pedersen (2005)]
- DMM reduces liquidity risk  $\Rightarrow$  lower  $r$

## **Traders/owners perspective**

- lower transaction costs
- cheaper exit for current owners/founders/venture capitalists
- however, not clear why this is relevant for the firm
  - short term traders benefit most
  - why subsidize short term trading/speculation?

**Main hypothesis** Decision to hire a DMM related to the probability of the firm interacting with the stock market in the near future.

**What we do:** Use data on DMM hirings at the Oslo Stock Exchange to empirically investigate the question.

**What we find:**

- Liquidity improves and price increase after DMM deals
- DMM hirers are more likely to need new capital (Q)
- DMM firms more likely to issue or repurchase shares ex post
- Hiring a DMM reduces liquidity risk loading
- Cost of (equity) capital drops significantly

Two Strands:

- Market microstructure
- The interaction of market liquidity and corporate finance

## Studies of DMM initiations

- **Stockholm** [Anand et.al, 2008], **Deutsche Börse** [Hengelbrock, 2008], **EuroNext** [Menkveld/Wang, 2009], **Paris Bourse** [Venkataraman/Waisburd, 2007]

## Typically find

- Liquidity improves after the introduction of a DMM
- Positive liquidity externality from having a DMM, attract more traders to the stock
- The stock market views the hiring of DMMs as a positive signal

An evolving literature that link market microstructure to corporate finance.

Some examples:

- [Lipson/Mortal \[2009\]](#) – firms with better market liquidity have lower leverage and prefer equity financing.
- [Butler/Grullon/Weston \[2005\]](#) – investment banking fees (issuing costs) lower for more liquid firms
- [Brockman/Howe/Mortal \[2008\]](#) – firms with more liquid equity more likely to use repurchases relative to dividends (flexibility vs. transaction costs)

⇒ treats liquidity as an *exogenous* property of the stock.

# Our innovation relative to the literature

By hiring a DMM, liquidity can be directly influenced by the firm that has issued the stock.

We treat the hiring of Designated Market Makers as *endogenous decisions*, and ask:

- What influences this decision?

Oslo Stock Exchange (OSE) – Electronic limit order market, main market for trading of Norwegian stocks

- DMMs allowed at the OSE from October 2004
- look at DMM hirings from 2004 through 2010
- the DMM is paid by the firm to “maintain an orderly market”
  - little info on actual costs
  - Anand et.al [2009], USD 25k – 100k per year in Swedish data, 28 contracts
  - Norway - USD 30k per year
- OSE tracks stocks with DMM to ensure that the DMM fulfills obligations

# Describing DMM deals at the OSE

Year	2004	2005	2006	2007	2008	2009	2010
Total active stocks at OSE	207	238	258	292	286	263	235
Active DMM contracts	7	30	42	50	57	47	48
% of firms with contract	3%	13%	16%	17%	20%	18%	20%

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## **Firm size (MCAP) groups**

N(firms) in size quartile 1 (small)	0	4	11	17	24	32	32
N(firms) in size quartile 2	2	16	19	15	18	9	8
N(firms) in size quartile 3	3	5	8	14	11	6	6
N(firms) in size quartile 4 (large)	2	5	4	4	4	0	2

# What is the effect on the market of hiring a DMM?

First, check that effect of DMM initiations is similar at the OSE as other markets

- 1 Does liquidity improve?
- 2 Does the market react?

# Does liquidity improve?

Liquidity measures before and after market maker deals.

	6 months		
	before	after	change
Relative Spread	3.9%	2.4%	-1.5%***
LOT	4.1%	3.1%	-1.1%***
Amihud ILR	0.62	0.41	-0.21**
Turnover (month)	4.3%	5.1%	0.8%
Fraction days traded	0.76	0.82	0.06***

\*\*\* 1%, \*\* 5%, \* 10% significance level

# Does liquidity improve?

Liquidity measures before and after market maker deals.

	6 months			1 year		
	before	after	change	before	after	change
Relative Spread	3.9%	2.4%	-1.5%***	3.9%	2.6%	-1.3%***
LOT	4.1%	3.1%	-1.1%***	4.3%	3.7%	-0.6%*
Amihud ILR	0.62	0.41	-0.21**	0.57	0.44	-0.13
Turnover (month)	4.3%	5.1%	0.8%	4.2%	5.8%	1.6%**
Fraction days traded	0.76	0.82	0.06***	0.75	0.82	0.07***

\*\*\*1%, \*\*5%, \*10% significance level

Event study, centered at date of DMM introduction.

$$AR_{i,t} = r_{i,t} - [\hat{\alpha}_i + \hat{\beta}_i r_{m,t}] \quad (1)$$

# Market reaction to DMM introduction

Event study, centered at date of DMM introduction.

$$AR_{i,t} = r_{i,t} - [\hat{\alpha}_i + \hat{\beta}_i r_{m,t}] \quad (1)$$

t	$\bar{CAR}$	$J_1$	$J_2$
0	2.05%	7.337***	8.310***
1	1.80%	5.982***	6.669***
2	2.04%	6.324***	6.631***
3	1.17%	4.899***	4.527***
4	1.41%	3.917***	3.650***
5	1.12%	3.115***	2.791***

⇒ Significant t=-5 to +5 day CAR around 1% associated with DMM hirings.

# What is the effect on the market of hiring a DMM?

Summarizing results:

- ① Liquidity improves
- ② The market reacts positively

Similar results in our sample as other studies on DMMs for other markets.

## What determines the decision to hire a DMM?

- Decision theoretic empirical analysis (Probit)
- $Pr(\text{Hire DMM})=f(\text{likelihood of accessing market})$

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  - ex-post: actual repurchases over next year
- Other variables
  - insider transactions (ex-post exit motivation)
  - <2 years since listing (ex-ante exit motivation)
  - Pre-DMM liquidity

# Probit analysis: Ex-ante variables

Model	<u>New DMM hire</u>	
	(1)	(2)
Liquidity (RelSpread)	-7.40** (0.03)	.
Q last year	0.30*** (0.00)	0.30*** (0.00)
Repurchase program	0.15 (0.49)	0.15 (0.49)
Listed < 2 years	0.40** (0.03)	.
Constant	-1.33*** (0.00)	-1.62*** (0.00)
N (firm/years)	368	425
Pseudo R <sup>2</sup>	0.12	0.09

# Probit analysis: Ex-ante variables

Model	New DMM hire		New/maintain DMM	
	(1)	(2)	(3)	(4)
Liquidity (RelSpread)	-7.40** (0.03)	.	-17.42*** (0.00)	.
Q last year	0.30*** (0.00)	0.30*** (0.00)	0.29*** (0.00)	0.31*** (0.00)
Repurchase program	0.15 (0.49)	0.15 (0.49)	0.26 (0.13)	0.33** (0.04)
Listed < 2 years	0.40** (0.03)	.	0.37*** (0.01)	.
Constant	-1.33*** (0.00)	-1.62*** (0.00)	-0.41** (0.02)	-1.26*** (0.00)
N (firm/years)	368	425	437	494
Pseudo R <sup>2</sup>	0.12	0.09	0.17	0.09

# Probit analysis: Ex-post variables

Model	<u>New DMM hire</u>	
	(1)	(2)
Liquidity (RelSpread)	-6.73* (0.06)	.
Issue equity	0.41** (0.03)	0.36*** (0.01)
Actual repurchase	0.42** (0.03)	0.35** (0.02)
Insider trades (sells)	0.02 (0.34)	.
Constant	-1.26*** (0.00)	-1.54*** (0.00)
N (firm/years)	329	559
Pseudo R <sup>2</sup>	0.07	0.03

# Probit analysis: Ex-post variables

Model	New DMM hire		New/maintain DMM	
	(1)	(2)	(3)	(4)
Liquidity (RelSpread)	-6.73* (0.06)	.	-16.73*** (0.00)	.
Issue equity	0.41** (0.03)	0.36*** (0.01)	0.23 (0.12)	0.24** (0.04)
Actual repurchase	0.42** (0.03)	0.35** (0.02)	0.36*** (0.01)	0.40*** (0.00)
Insider trades (sells)	0.02 (0.34)	.	-0.02 (0.46)	.
Constant	-1.26*** (0.00)	-1.54*** (0.00)	-0.14 (0.45)	-1.07*** (0.00)
N (firm/years)	329	559	392	633
Pseudo R <sup>2</sup>	0.07	0.03	0.10	0.02

## Ex ante:

- Proxy for future capital needs ( $Q$ ) an important determinant of hiring a DMM
- some support for planned repurchases
- newly listed firms more likely to hire DMM (insider exit?)

## Ex post:

- firms that hire DMMs more likely to issue/repurchase shares ex post
- post-DMM insider exits not significant

## Asset pricing with liquidity risk

- E.g. Pastor/Stambaugh (2003), Acharya/Pedersen (2005)
- Norway: Næs/Skjeltorp/Ødegaard (2008,2009)

## DMM effect on liquidity risk

- traditional market makers control their risk and inventory by changing spread and/or price
- DMMs unable to do this, i.e. paid to take liquidity risk that otherwise would be present in the market
- **Implications:**
  - reduction in liquidity risk for stocks that hire DMM
  - i.e. lower risk premium for DMM stocks

## Does hiring a DMM affect liquidity risk?

Estimate a two-factor market model:

$$er_{i,t} = \alpha_i + \beta_i^m er_{m,t} + \beta_i^{liq} LIQ_t + \varepsilon_{i,t} \quad (2)$$

$er_{m,t}$  = market return (excess of risk free)

$\beta_i^m$  = loading on market risk (market beta)

$LIQ_t$  = return difference between low/high liquidity portfolios

$\beta_i^{liq}$  = loading on liquidity risk

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$\beta_i^{liq}$  = loading on liquidity risk

	Liquidity beta ( $\beta^{liq}$ )		Test for difference	
	Pre DMM	Post DMM	change	p-value
DMM stocks, mean	0.114	-0.062	-0.176***	0.002
DMM stocks, median	0.044	-0.022	-0.157**	0.014

⇒ Significant drop in liquidity risk loading

⇒ liquidity risk loading closer to larger/liquid stocks after DMM

# Economic significance of liquidity risk reduction

Is there a liquidity risk premium at the Oslo Stock Exchange?

*Risk premia estimates, Oslo Stock Exchange 1980-2010*

	CAPM		Two factor model	
Factor	$\lambda[k]$	p-val.	$\lambda[k]$	p-val.
$er_m$	0.014	(0.00)	0.0113	(0.00)
$liq$	-	-	<b>0.0119</b>	<b>(0.00)</b>
GMM $J$ -test	$J(\chi^2(8))$	p-val.	$J(\chi^2(7))$	p-val.
	24.47	(0.00)	9.26	(0.16)

- significant risk premium associated with liquidity
- reduction in liquidity beta following a DMM hiring implies
  - 2.5% lower expected returns for DMM stocks (annualized)
  - suggest an economically significant effect on cost of capital

## Why pay for a DMM?

- Secondary market liquidity matters *to the firm* because of the market's role when *new* capital is raised
- Firms pay to improve liquidity when they plan on accessing the stock market in the near future

## Implications for asset pricing

- liquidity risk loading drops, liquidity risk transferred to DMM
- 2.5% lower expected return (annualized)

⇒ suggest an economically significant effect on cost of capital

⇒ likely to cover the cost of having a DMM

**EXTRA SLIDES**

# Liquidity risk premium at the OSE

Panel A: Market and liquidity risk loadings

Portfolio	$a_i$	$\beta_i^m$	$\beta_i^{liq}$
1 (low spread)	-0.003 (0.36)	1.06 (0.00)	-0.40 (0.00)
2	-0.003 (0.41)	0.98 (0.00)	-0.37 (0.00)
3	-0.002 (0.64)	1.08 (0.00)	-0.24 (0.00)
4	-0.001 (0.70)	0.90 (0.00)	-0.19 (0.00)
5	-0.001 (0.87)	0.95 (0.00)	-0.09 (0.26)
6	-0.001 (0.79)	0.88 (0.00)	-0.13 (0.01)
7	0.000 (0.93)	0.89 (0.00)	0.04 (0.58)
8	0.003 (0.57)	0.93 (0.00)	0.32 (0.00)
9	0.004 (0.40)	1.00 (0.00)	0.44 (0.00)
10 (high spread)	0.006 (0.18)	1.06 (0.00)	0.68 (0.00)

Panel B: Risk premia estimates

Factor	CAPM		Two factor model	
	$\lambda[k]$	p-val.	$\lambda[k]$	p-val.
$er_m$	0.014	(0.00)	0.0113	(0.00)
$liq$	-	-	0.0119	(0.00)
GMM $J$ -test	$J(\chi^2(8))$	p-val.	$J(\chi^2(7))$	p-val.
	24.47	(0.00)	9.26	(0.16)