The resilience of the US Treasury market

SUERF Webinar
May, 2024

Market structure: Dealer balance sheets are used for all investor trades
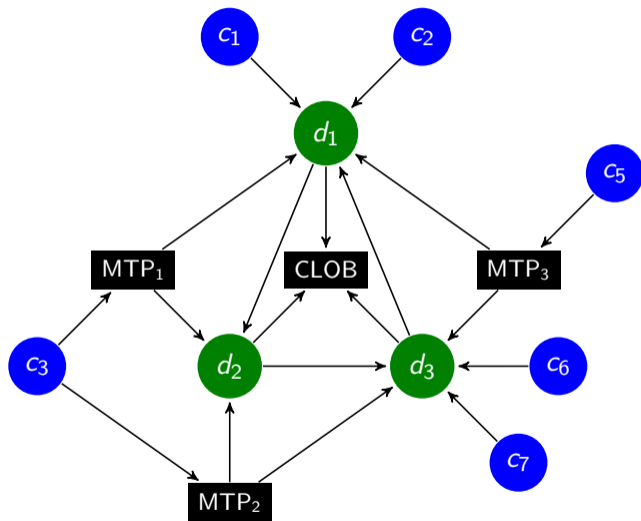
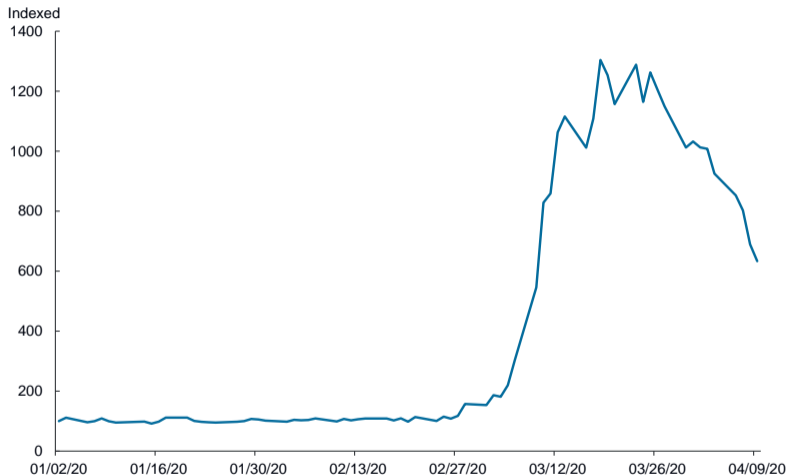# Covid caused an explosion of dealer-to-customer bid-offer spreads

Figure: US Treasury bid-offer spreads, indexed to 100 at January 2, 2020. Source: Lorie Logan, Federal Reserve Bank of New York, Speech of April 14, 2020. Data source: Bloomberg dealer bid and offer prices in the dealer-to-customer market.

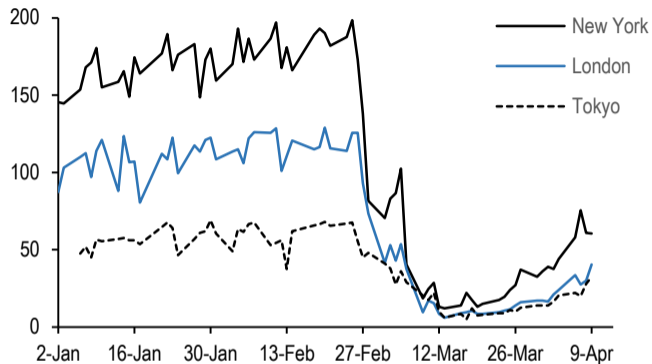# Interdealer market depth virtually disappeared

Figure: Treasury market depth on Brokertec, in millions of dollars. The market depth shown is the average of the largest three amounts bid or offered on Brokertec's interdealer central limit order book market (New York, London, and Tokyo, respectively) for on-the-run 10-year U.S. treasuries between 8:30am and 10:30am EST. The figure was obtained from JP Morgan, US Fixed Income Strategy, Joshua Younger and Henry St. John, April 2, 2020.

Liquidity is limited by dealer balance-sheet capacity

Ratio of Treasuries outstanding to total primary-dealer assets
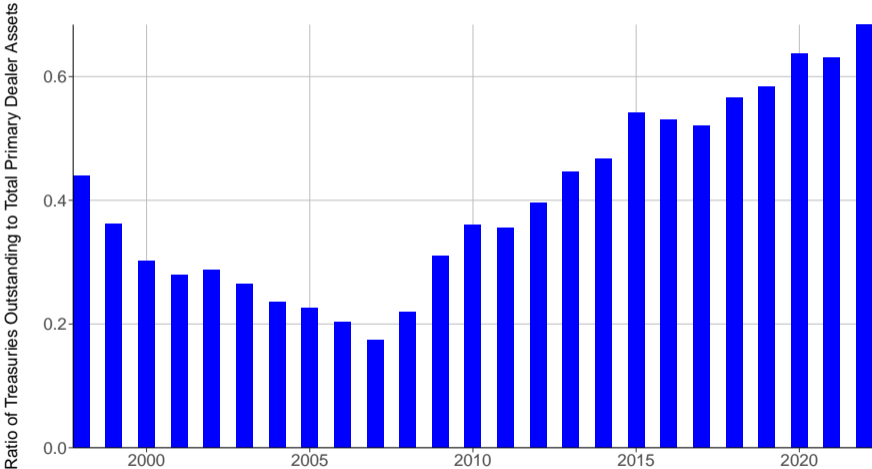
The Fed had to quickly remove Treasuries from dealer balance sheets
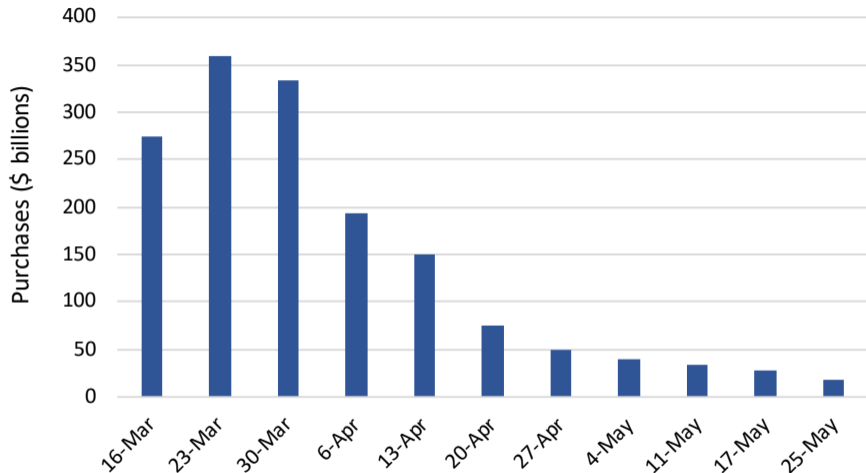
Figure: Total weekly purchases of Treasuries from primary dealers by the Fed in the weeks of March 16 through May 25, 2020. Data: Federal Reserve. Source: Duffie (2020).

UST illiquidity is normally well explained by yield volatility, but in March 2020 something broke this relationship
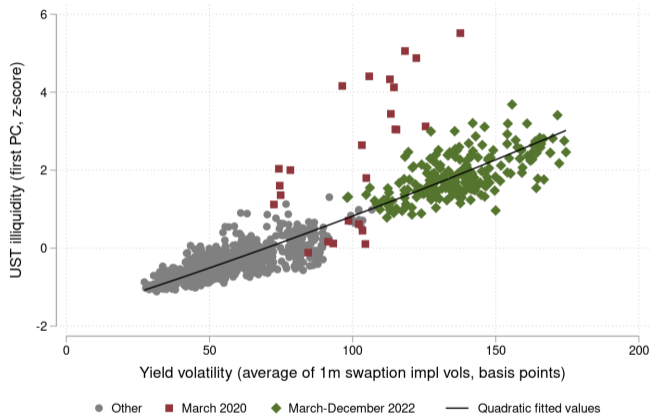

Figure: Predicted z-score of PC1 of Illiquidity: $y = -1.64 + 0.021x + 0.000037x^2$. Yield volatility x is in basis points. $N = 1,331$; $R^2 = 79.5\%$.

Something similar happened in the European sovereign bond market
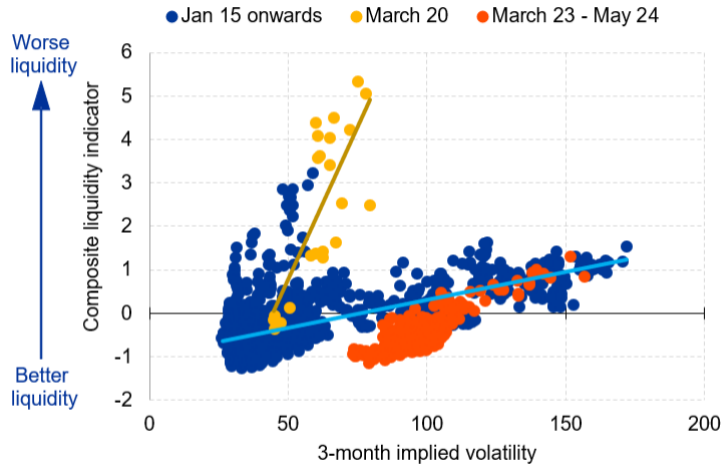
Figure: Source: Ferrara, Hudepohl, Karl, Linzert, Nguyen, Cruz (ECB, March, 2024).
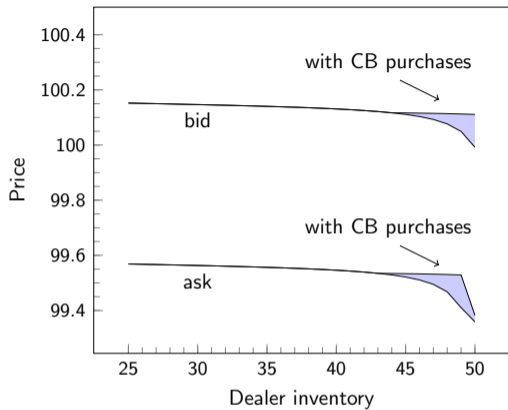
(a) Dealer bid and ask quotes.
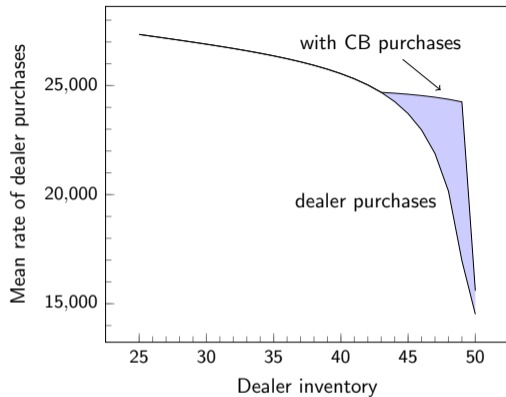
(b) Mean time rate of dealer purchases from customers, transactions per year.

Figure: Demand elasticity 400, supply elasticity 300, discount rate $r = 0.1$, implying a perfect-markets price of 100. Central-bank market-function purchase program is active whenever the inventory level x is at or above 45. Central bank purchases are at mean rate $\lambda(x) = B(b_x)/10$ and price $(a_x + b_x)/2$.

The component of UST illiquidity not explained by yield volatility is high whenever utilization of dealer intermediation capacity is high
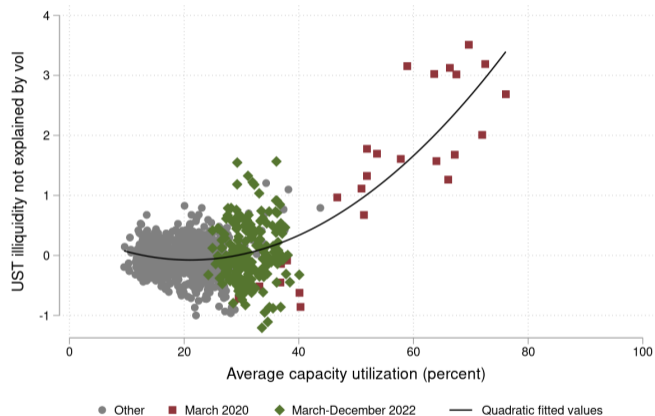
Figure: Predicted illiquidity z-score not explained by volatility is $y = 0.432 - 0.048x + 0.0011x^2$, with $R^2 = 43.6\%$. All three coefficient estimates have p-values of less than 1% (Newey-West).

Broad central clearing reduces settlement commitments
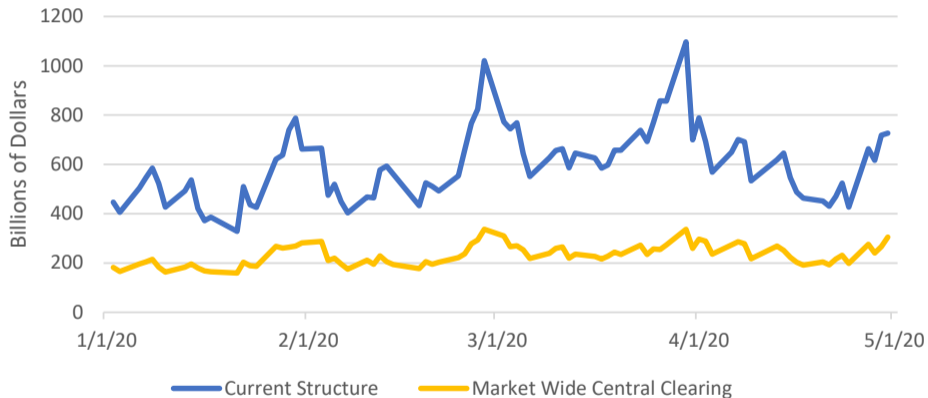
Figure: Source: Fleming and Keane, Federal Reserve Bank of New York, April 2021.

Policies for enhancing Treasury market resilience

1. Broader central-clearing mandates (SEC, December 2023).

2. Central bank financing facilities (SRF and FIMA, 2020).

3. Augmenting dealer intermediated trade with all-to-all trade.

4. Post-trade transactions reporting (TRACE, in progress).

5. Lifting exemptions to fair-access regulation of trade platforms (SEC proposal).

6. Reducing the leverage-ratio capital requirement relative to risk-based capital requirements, without lowering system-wide capital.

7. Treasury buybacks, beginning May 2024.

Appendix

COVID induced record foreign sales of Treasuries to US dealers

Figure: A histogram of monthly gross sales of U.S. Treasury bonds and notes by foreigners to U.S. residents, from January 2000. Data source: U.S. Department of the Treasury, Treasury International Capital System. The March 2020 observation is indicated in red.

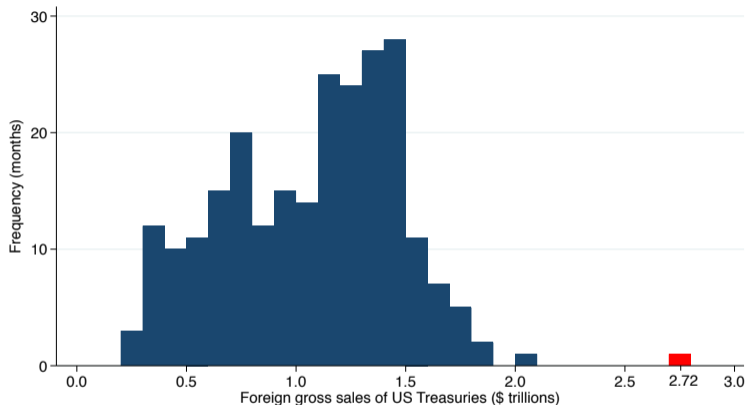# Since the GFC, Treasuries are growing faster than dealers
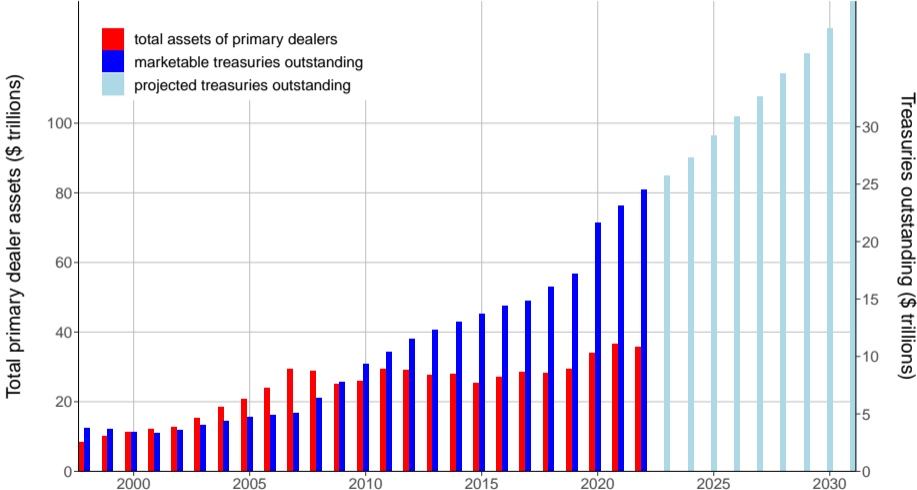
Estimating dealer capacity utilization

- ▶ Dealer level net and gross positions in UST, agency MBS, and corporate bonds, from FR2004.

- ▶ Dealer purchases and sales from customers over the past three business days, from TRACE.

- ▶ Risk adjustment is based on maturity-level swaption-implied volatilties and security-level DV01s.

- ▶ The capacity of a dealer for a given activity is estimated, based on revealed preference, as the sample maximum (implying a downward bias).

- ▶ The capacity utilization of a dealer is the ratio of its current activity metric normalized by its estimated maximum.

- ▶ The collective capacity utilization of dealers is the weighted average of utilization across dealers, using capacity weights.

Illiquidity tracks volatility except when dealer balance sheets are loaded
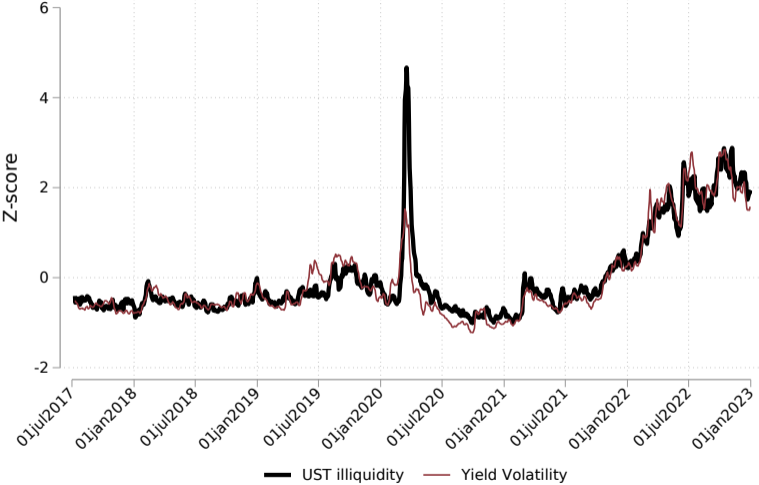
99th percentile illiquidity explained by volatility and capacity utilization

|	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Total capacity: gross position	1.245						
	(0.038)						
Total capacity: net Position		1.074					
		(0.141)					
Total capacity: gross DTC buys			0.924				
			(0.057)				
Average 1M Swaption-implied vol				2.077	0.883	1.270	1.270
				(0.317)	(0.315)	(0.243)	(0.091)
Residuals, gross position					0.775		
					(0.076)		
Residuals, net position						0.651	
						(0.047)	
Residuals, Gross DTC Buys							0.505
							(0.027)
Constant	1.260	2.366	2.076	1.742	1.085	1.265	1.082
	(0.039)	(0.338)	(0.158)	(0.305)	(0.098)	(0.097)	(0.073)
N	1331	1331	1331	1331	1331	1331	1331
Pseudo R^2	0.688	0.391	0.441	0.533	0.697	0.666	0.707

Revisiting market design and regulation
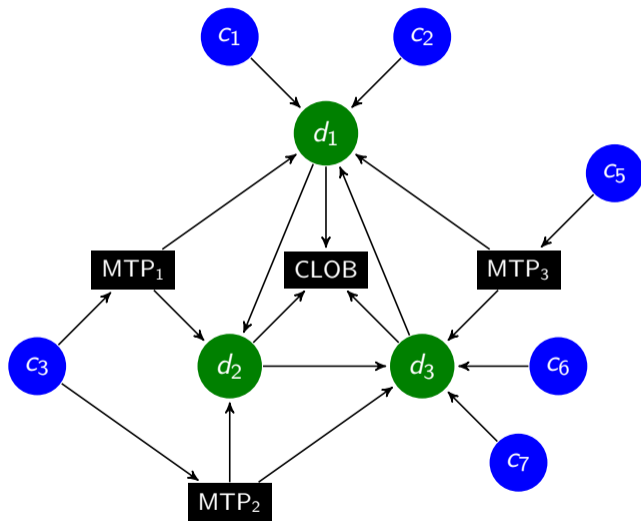
Broad central clearing
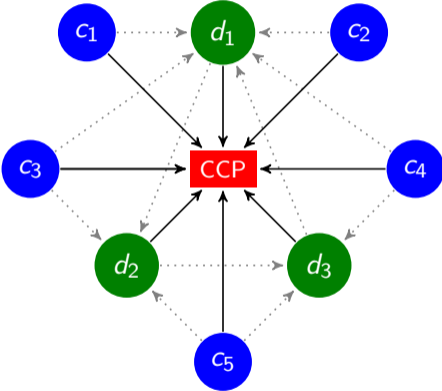
The first principal component of US Treasury market illiquidity
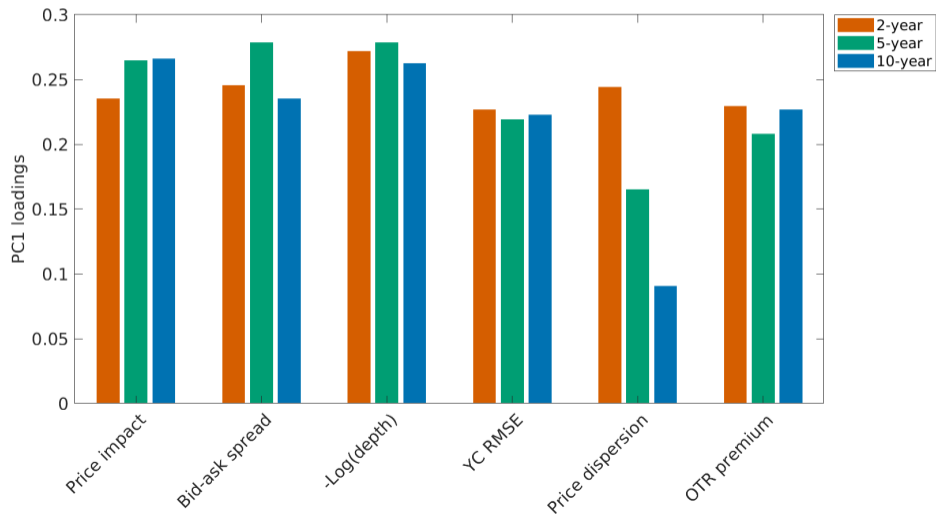
Estimated US Treasury market dealer capacity utilization
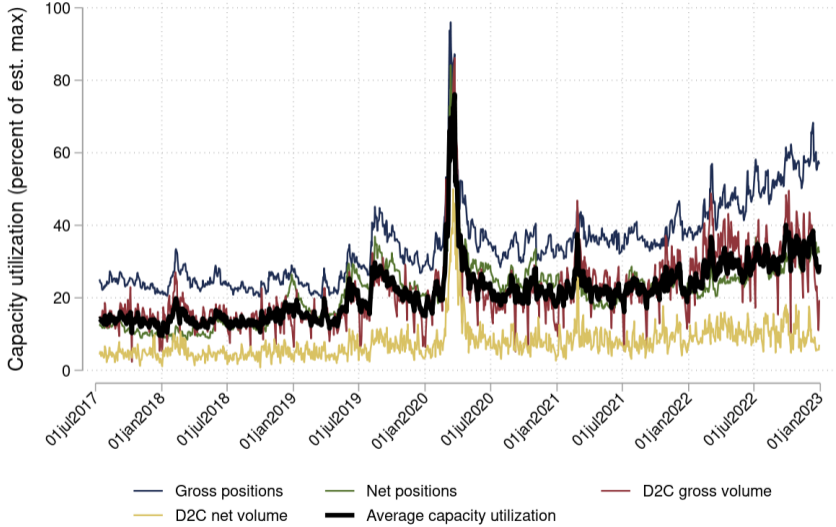
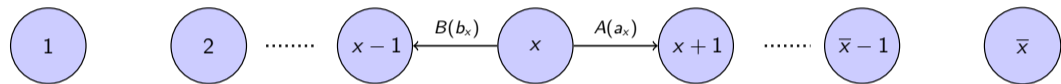# Pricing and trade under balance-sheet constraints with a monopolist dealer

Figure: Dealer inventory is a controlled Markov chain. At the current inventory level x the mean dealer purchase speed $A(a_x)$ and sale speed $B(b_x)$ are determined by the dealer's optimal ask price a_x and bid price b_x, respectively, obtained by solving the HJB equation for optimal dealer value $V(x)$.