TODO D Update/Verify tables

Add GREXIT Analysis Main (a Calculate Roll and Amihud Measures for GREXIT Body Appendix: Reanalysis of outliers included

Appendix: Sensitivity to CARA utility assumptions

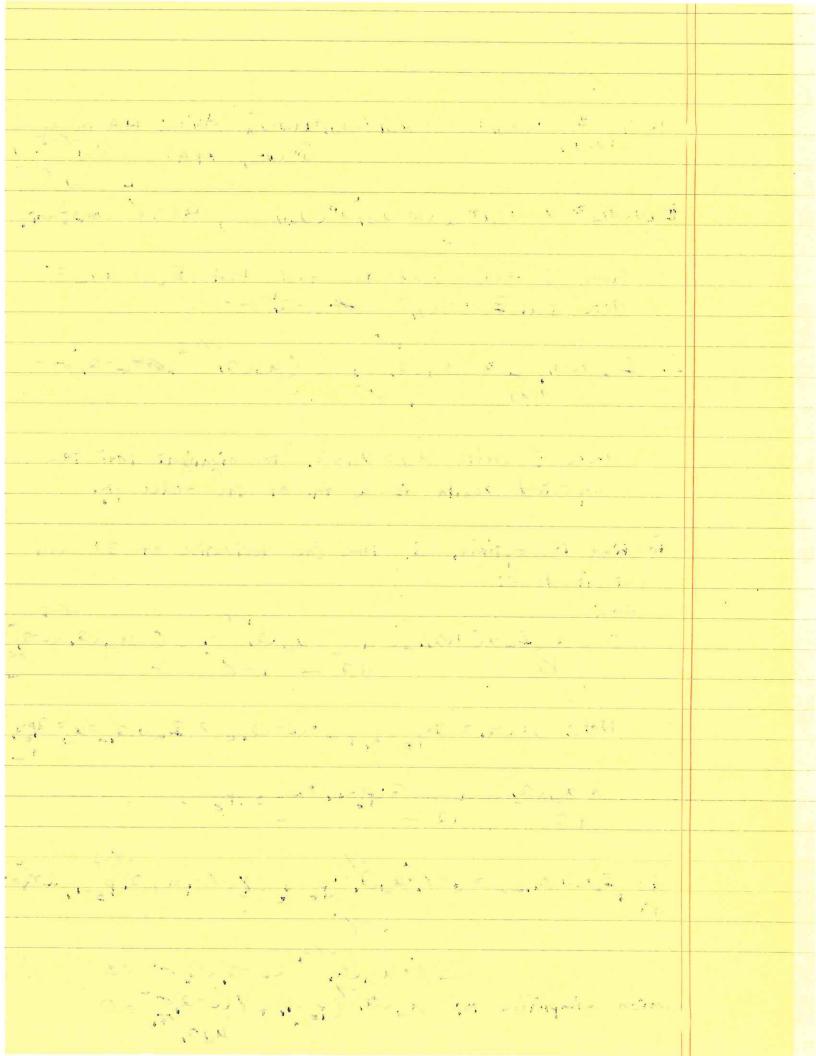
Appendices Appendix: Alternative estimators for DiD

Appendix: Alternative estimator for volatility Optimal Order Oty under CRPA utility? The final wealth of the liquidity trader is given w(a) = Q.p + (L-a). (1+z) = Q.p+ L-a+(L-a)= = Q(Pb-1) + L +(L-Q)Z Let the trader's utility for over wealth be:  $u(w) = \left( \frac{w^{1-\delta}-1}{1-\delta}, \gamma \neq 1 \right)$   $\ln w, \delta = 1$ Case 1: 8 + 1 Let uw = E[w(a)] = a. (p-1)+L be the expected wealth. A second-order Taylor-series approximation of the utility for around uw is given Ly U(W) = U(MW) + (W-MW) U(MW) + 1 (W-MW) - [- 260-2-1.W]

3 THE REST FRANCE OF THE PARTY OF I will at condit towns in the terms of AND THE TAR OF TRIBLES ON A in ser a der har midsen ser tree gen mi Oppose same real of the many we had the first to me to the day person of it is but he suit in the in the interpret the transfer of the state of the state of

E[U(W)] = U (MW)+ 1 (W-MW) U"(MW) PRA = 8 constant where I have used the fact that E[w-Mw]=0
Note that E(w-Mw)2 = 1 (L-Q)2 or 2 .. E[U(w)] \* Mw(a)-1-8 mw(a) 2-1 (L-a) 2-2 where I write  $\mu_{W} = \mu_{W}(a)$  to highlight that the expected wealth is a fn. of the order qty. To find the optional Q, take the derivative of EU and ος: 0 = d E[v(w(a))], d [μω(a) -1 - χ μω(a) (L-a)]

da [1-γ 2 Note: w(a) = 0(p-1)+L+(L-a)=> E[w(a)]=== 0(p-1)+L d mu(a) = d [a(p,-1)+L] = Pb-1 9 [E[n(n(a)]] = (1-8).hn(a) (b-1) - x(-8-1)nn(a)(b-1) (ta)3 which simplifies to:  $\mu_{W}(a)^{-1}(L-a)(-1)\sigma^{2}=0$   $\mu_{W}(a)^{-1}(P_{b}-1)+\frac{\gamma(L-a)\sigma^{2}}{\mu_{W}(a)^{-1}}=0$ 



Solving this for a one obtains: Aside RRA measure a= L + (Pb-1) MW(Q) 2+1

Note that this expression is similar to the optimal order quantity under CARA (previously derived):

CARA (Pb-1) + L w/ an additional

Mw (a) term in the numerator of the fraction showing order qty. is sensitive to the (expected) level of wealth of the trader.

The optimal bid price for dealer 1

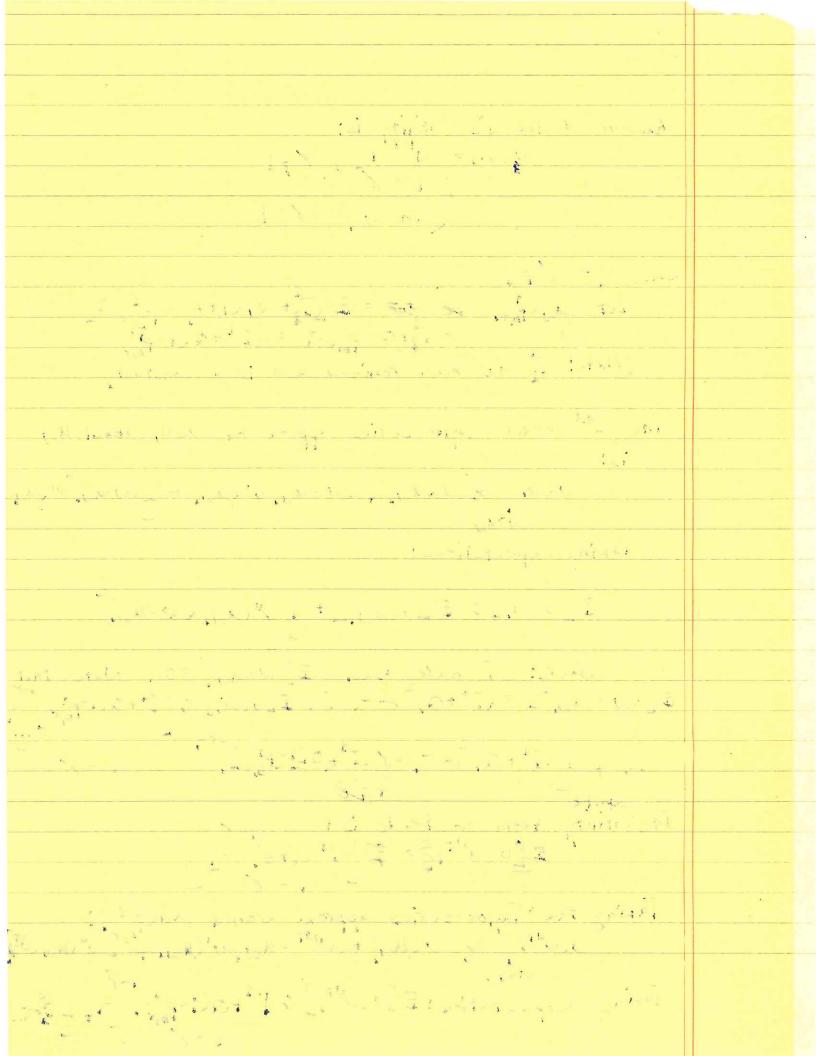
I now derive the optimal bid price for dealer 1 (Note: the problem is symmetric so dealer 2 will have the some solution).

> Dealer 1 receives random inventory posin INU(-R,R). If she has the best bid price and serves order gry a, his/her wealth at the end of the game is: W=(I=+Q)(1+Z)-P=Q

If she does not receive the order flow, s/he will have wealth W= T1 (1+2)

At some price pir the dealer will be indifferent between trading and not trading. This happens when  $u(w^{NT}) = u(w)$ .

taletic at a replication of the was or - think the when we it which i was the first and production of the second of th rion rather mobile will a many ing the Fire The wife the print of the first that and his of the code say you to supplied the same carrie and in white and the in mayor in indicate the livery operation in the second



-8 MM 4-8-1  $\mathbb{E}\left[U(W^{NT})\right] \approx \mathcal{M}_{W}(P_{b,r}^{1})^{-1} + \mathcal{I}^{2}\sigma^{2}\mathcal{M}_{W}(P_{b,r}^{1})^{-1}$ The trader is indifferent when: E[U(WNT)] = E[U(W)]  $\frac{\left[\mu_{\mathsf{W}}(\mathsf{P}_{\mathsf{b},\mathsf{Y}}^{1})^{\frac{1}{2}-1}\right]}{\left[1-\mathsf{Y}\right]} - \frac{\mathsf{Y}}{\mathsf{Y}} \cdot \mathsf{I}^{\frac{1}{2}} \left[\mu_{\mathsf{W}}(\mathsf{P}_{\mathsf{b},\mathsf{Y}}^{1})\right] \mathsf{Y}^{-1}$ I1 [ Mw (Pb, x ] = (I1 + 201 + 02) [ Mw (Pb, x ] (I1) = (I1) + 2011 + Q2 }  $(I^1)^2 - (I^1)^2 - 20I = 0$ This ha Note that the reservation price is Pro of Toz & MW (Prib) wlo solving explicity I argue that under competition, the dealer's markup (not shown) will tend to zero and prices will tend to the reservation price.

