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The relationship between central bank auctions and bill market liquidity

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Abstract

This paper investigates the relationship between central bank (reverse) auctions and bill market liquidity. The analysis includes data on the purchases of bills in the auctions by the Dutch Central Bank under the European Central Bank's Pandemic Emergency Purchase Programme (PEPP). The results indicate that auctions contribute to smooth market functioning. Two findings stand out. First, by purchasing bills using auctions rather than bilaterally, the central bank increases the bid-to-cover ratio at bill issuance, especially in times of stress. Second, bills are offered at larger sizes and lower prices in central bank auctions near primary issuance.

JEL codes: E42, E44, E52, E58, G12

Key Words: Central bank auctions, bills, liquidity

Non-technical summary

A substantial part of government spending during the COVID-19 crisis is financed via bills, leading to upward pressure on short-term interest rates. Against this background, the ECB and euro area national central banks have purchased bills under the Pandemic Emergency Purchase Programme (PEPP). Under the PEPP, all national central banks purchase bills bilaterally, except for the Dutch Central Bank, which purchases most bills using (reverse) auctions. Auctions are particularly efficient in the bill market because bills are highly comparable and have low interest rate risk. Using transaction-level data from the Dutch Central Bank, this paper investigates the relationship between central bank auctions and bill market liquidity.

The advantage of focusing on the euro area is that the implementation of monetary policy is decentralized across national central banks, which allows for comparing different designs of monetary operations. So far, no study has looked at auctions by euro area central banks. As such, this paper is the first to study the impact of central bank auctions on bill market liquidity using a treatment and control group within one monetary union. In addition, this paper adds to the literature by exploring whether the performance of central bank auctions can be explained by the primary issuance of bills.

The empirical findings suggest that central bank auctions contribute to smooth market functioning for two reasons. First, amid a liquidity crisis, purchasing bills using central bank auctions rather than bilaterally increases the bid-to-cover ratio in the government auctions of bill issuance. Second, bills are offered at larger sizes and lower prices in central bank auctions that are near the primary issuance of the offered bill. The results indicate that, if market stabilisation is required for safeguarding the monetary policy transmission process, central banks can act as market makers of last resort using auctions.

1 Introduction

The COVID-19 crisis has led to a surge in government spending. A substantial part of this is financed via bills (i.e. government debt with maturities below 1 year), leading to upward pressure on short-term interest rates. Against this background, the European Central Bank (ECB) and euro area national central banks have purchased bills under the Eurosystem's Pandemic Emergency Purchase Programme (PEPP).[1]

While the Dutch Central Bank (DNB) purchases most bonds bilaterally, it is buying a substantial share of the outstanding bills using (reverse) auctions.[2] The implementation of auctions is common practice outside the euro area, applied by the Federal Reserve and Bank of England, among others. In auctions, the central bank collects offers of multiple instruments from different counterparties at a pre-announced time. Similar to the 'request-for-quote' method of bilateral purchases, there is no commitment in the auctions to purchase any of the offered bills at the offered price. The main difference with bilateral purchases is that the central bank publicly communicates the date and time at which offers will be considered in auctions.

The costs and benefits of auctions as an execution method of central bank asset purchases differ by market segment and market conditions. Auctions are an efficient purchase method in the bill segment for several reasons. First, auctions allow for a broad comparison between different types of instruments across different dealers. This is especially useful when purchasing bills, because they are highly comparable (i.e. small differences in maturity). Second, auctions contribute to smooth market functioning, especially during a systemic liquidity crisis, because auctions generate transparency on when the central bank is considering offers. In a systemic liquidity crisis, coordination failures among market participants and the associated loss of confidence lead to systemic shortages of financing and market liquidity, making markets subject to runs (e.g. Cec-

[1] The eligibility criteria under PEPP were widened in comparison to the PSPP. Bills with a maturity below 70 days remained ineligible under PEPP, however.

[2] DNB purchases only bills that are issued by the Dutch government.

chetti and Disyatat, 2020). By publicly announcing the implementation of auctions in times of systemic liquidity stress, the central bank reduces uncertainty by informing end-investors about when they could potentially sell their respective paper holdings, thereby restoring market functioning. Moreover, the central bank publishes aggregated data on offer prices and sizes after each auction, which contributes to price discovery and further improves market liquidity during stress episodes. Third, when purchasing short-term instruments with low interest rate risk and therefore low price volatility, the costs of the auctions' large trading size and time lag between the offer submission and allocation are small.[3] Fourth, auctions facilitate the efficient acquisition and maintenance of a bill portfolio, which is time intensive via bilateral trades due to the sizable reinvestments.

The goal of this paper is to empirically gauge the relationship between central bank auctions and liquidity in the euro area bill market. While no earlier study has examined the relationship between auctions and bill market liquidity, the analysis relates to a scarce literature that focuses on the pricing effects of auctions by the Federal Reserve and Bank of England in longer-term bond markets. Breedon (2018) and Song and Zhu (2018) find that the Bank of England and Federal Reserve extract profits from auctions by purchasing bonds that are undervalued relative to the market price. Song and Zhu (2018) also show that market dealers similarly generate profits from the Federal Reserve's auctions, since the central bank purchases larger quantities of undervalued bonds, and strategic dealers can infer from price data which bonds are relatively cheap. In addition, Joyce and Tong (2012) find that the Bank of England's auctions are associated with additional reductions in bond yields, although the magnitude of this effect diminishes over time.[4]

The contribution of this paper to the above studies is twofold. First, this paper is

[3] For longer maturities, dealers may require a premium for participation in auctions that are slower and larger than bilateral trades.

[4] Many study the impact of monetary policy on bond market pricing (e.g. D'Amico et al., 2012, D'Amico and King, 2013, Bauer and Rudebusch, 2014, Eser and Schwaab, 2016, Van Spronsen and Beetsma, 2021), but they do not focus on the specific effects of central bank auctions.

the first to investigate the impact of central bank auctions on market functioning using a treatment and control group of different sovereign bond markets within one monetary union. This is because, so far, no study has looked at auctions by central banks in the euro area. The advantage of focusing on the euro area is that the implementation of monetary policy is decentralized across the national central banks of the Eurosystem, which allows for comparing different designs of monetary operations across countries that are impacted by the same monetary policy decisions. In the case of bill purchases under the PEPP, DNB is the only Eurosystem central bank that purchases bills using auctions. Therefore, this paper empirically compares developments in the Dutch bill market with developments in the French and German bill markets, where no auctions have been implemented. To determine the impact of central bank auctions on market functioning, this paper analyzes developments in the bid-to-cover (b/c) ratio for the primary issuance of bills. The b/c ratio, defined as the total amount of bids placed in the auction of the selling government over the total amount allotted, is considered an effective measure of market functioning because it reflects the extent of competition surrounding issuance.[5] From this perspective, the literature shows that the b/c ratio matters for financing conditions in the secondary market of government debt. More specifically, a higher b/c ratio is found to lead to more efficient pricing by governments and lower secondary-market yields (e.g. Goldreich, 2007 and Beetsma et al., 2018). Second, this paper uses unique transaction-level data from the DNB portfolio management system, and explores whether developments in the primary market of bills affect the performance of central bank auctions.

The empirical findings signal that central bank auctions can restore market functioning at the height of a liquidity crisis. There are two key takeaways that are novel to the literature. First, by purchasing bills using auctions rather than bilaterally, the central bank increases the b/c ratio in the government auctions of bill issuance, especially in

[5]The number of primary dealers in the government auctions is indeed found to be a determinant of the b/c ratio at issuance (Beetsma et al., 2020).

times of market stress. Second, bills are offered at larger sizes and lower prices in central bank auctions when the auction takes place within 7 days before or after the issuance of the offered bill. Together, the results indicate that central banks can stabilise bill markets through purchasing bills using auctions rather than bilaterally. As such, the findings provide support for that auctions are an effective implementation tool for the central bank in its role as a market maker of last resort (see also Buiter and Sibert, 2007 and Hauser, 2021), adding to other recent initiatives such as the Federal Reserve's Standing Repo Facility (Afonso et al., 2022).[6]

The rest of this paper is organized as follows. Section 2 discusses the data. Section 3 presents the empirical analysis and results. Section 4 concludes.

2 Data

The analysis uses data from different sources. Transaction-level data are taken from the DNB portfolio management system. These data cover the transactions in all central bank auctions in 2020 (34 different auctions, each including multiple transactions, and in total approximately 1300 offers from around 20 different dealers), including both the offer amounts and prices at the bill-level. To identify the relative market share of DNB, and the relative cheapness of the offered bills, the analysis uses data on the outstanding amount (excl. the net amount of purchases by DNB) and average market yields of bills. These data are retrieved from Bloomberg. Further, the analysis includes data on the spread between the average yield of the offered bill and the average yield of all German bills to indicate the relative cheapness of a Dutch bill.[7] These data are also from

[6]The Federal Reserve's Standing Repo Facility (SRF), which was initiated in July 2021, smooths market functioning and thereby supports the monetary policy transmission by serving as a backstop in money markets. Using the SRF, market dealers can obtain overnight finance in exchange for Treasuries, agency debt, and agency mortgage-backed securities.

[7]Using the spread between the offer yield of bills and the average of Dutch short-term government bond yields as an alternative indicator gives identical results. Yields are taken from three Dutch short-term government bonds that mature in July 2021, January 2022 and July 2022, respectively. The money market yields of these bonds have been obtained by multiplying the bond yields by 360/365.

Table 1: Descriptive statistics of the issuance data

Variables	Obs		Mean		Std Dev		Min		Max	
	Before	After	Before	After	Before	After	Before	After	Before	After
Netherlands										
B/C ratio	53	47	1.56	1.81	0.27	0.33	1.17	1.12	2.62	2.45
Allotted (bln)	53	47	1.53	1.55	0.78	0.74	0.40	0.40	3.09	2.99
France										
B/C ratio	210	105	3.40	2.96	1.05	0.78	1.42	1.33	8.06	5.24
Allotted (bln)	210	105	1.86	1.91	0.92	0.70	0.28	0.70	4.50	3.77
Germany										
B/C ratio	23	30	1.73	1.95	0.44	0.77	1.10	1.20	2.40	4.00
Allotted (bln)	23	30	1.55	1.54	0.69	0.66	0.40	0.40	2.79	2.80

Notes: This table presents the descriptive statistics of the b/c ratios and allotted amounts in the government auctions of the Dutch, French and German bill issuances separately. Each descriptive statistic is shown for the period before and after the start of the auctions by DNB.

Bloomberg. In addition, the analysis accounts for developments in the primary market of bills by obtaining data from the Dutch State Treasury Agency on the primary issuance of Dutch bills in the regular government auctions. The sample also includes data on the primary issuance of bills in French and German government auctions, so as to control for developments in bill markets where no central bank auctions have taken place. These data are respectively from the French and German State Treasury Agencies. Last, as a gauge of market selloff, the analysis uses the spread between bill yields and 6-month OIS rates.[8] The OIS rates also stem from Bloomberg.

Table 1 presents the descriptive statistics of the b/c ratios and allotted amounts in the government auctions of the Dutch, French and German bill issuances during the periods before and after the start of the auctions by DNB. The summary statistics of the data on the monetary transactions in the auctions by DNB are not provided due to the strict data confidentiality. Several observations stand out. First, the allotted amounts in the government auctions of bill issuance are relatively stable across the two

[8]While the remaining maturities of the bills in the sample do not exactly match the 6-month maturity of the OIS rates, differences in OIS rates across shorter-term maturities were negligible during the pandemic. Moreover, measuring from the daily variation, the correlation between shorter-term OIS rates is practically 1. For example, in February, March and April 2020, the 6- and 12-months OIS rates differed by only 2 basis points on average, and their correlation was 0.99.

periods studied, which suggests that the Dutch, French and German governments have not issued more bills in response to the start of bill purchases under the PEPP. Second, the average b/c ratio in the French government auctions is approximately twice the size of the average b/c ratios in the Dutch and German government auctions. Third, the total number of government auctions in France exceeds the total number of government auctions in the Netherlands and Germany. Fourth, after the start of the auctions by DNB, the average b/c ratio for the primary issuance of bills increased in the Netherlands and Germany but decreased in France. Fifth, the increase in the Dutch b/c ratio is larger than the increase in the German b/c ratio. In view of the large differences between the developments in the French primary market versus the primary market of Dutch and German bills, data on the French bill market are excluded from the empirical analysis in a separate robustness check.

3 Empirical analysis

3.1 Impact of central bank auctions on the bid-to-cover at issuance

The high transparency associated with auctions can safeguard market functioning when there is market turmoil. The implementation of central bank auctions is publicly announced, which informs market participants (dealers and end-investors) about when their offers would be considered.[9] In addition, aggregated data on the allocated offer prices and sizes are published after each auction, which reduces information gaps between market participants and contributes to the price discovery process. By implication, central bank auctions can reduce uncertainty in times of stress, since market participants know that there is a buyer for the respective type of paper, thereby contributing to the smooth functioning of the primary market of bills.

Indeed, Figure 1 shows that the b/c ratio for the Dutch bill issuance increased after

[9]By contrast, potential offers may be disregarded when purchasing bills bilaterally, since the central bank does not publicly announce when it purchases bills under bilateral purchase methods.

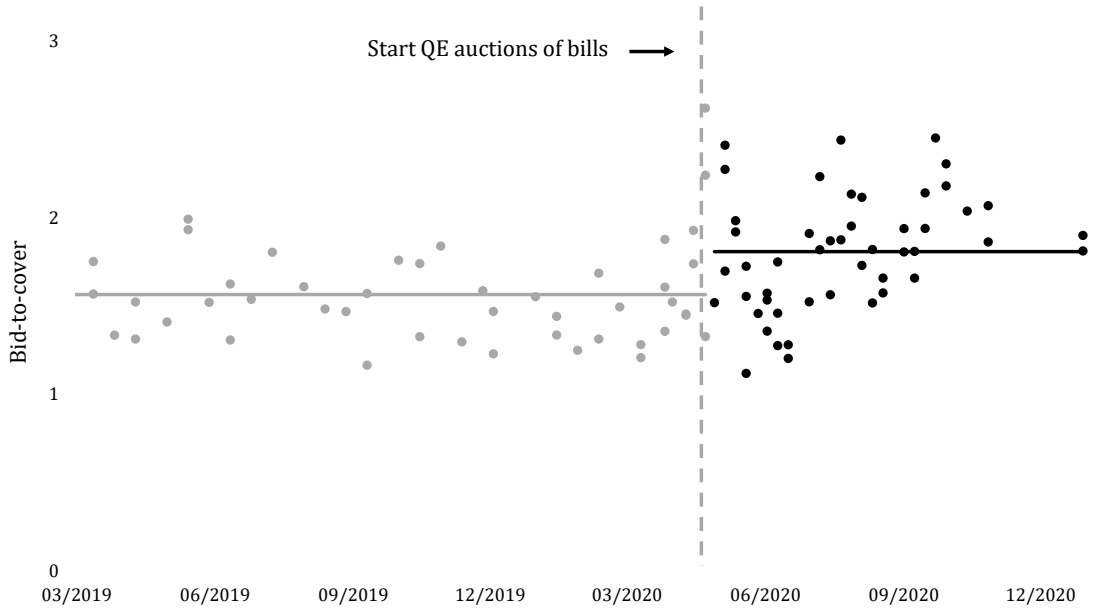

Figure 1: Bid-to-cover in the primary issuance of Dutch bills

Notes: This figure shows developments in the b/c ratio for the primary issuance of Dutch bills. The average b/c ratio is 1.56 before the start of the central bank auctions and 1.81 after the start of the central bank auctions.

the start of the auctions by DNB. The data also show that the b/c ratio had temporarily become more dispersed at the onset of the COVID-19 crisis, which can be explained by the significantly larger variation in the allotted amounts of Dutch bills at that time. The estimated variance in the total amounts of allotted bills at issuance was approximately six times larger in April and May 2020 compared to the period before the pandemic.

To determine whether the increase in the b/c ratio for the Dutch bill issuance follows specifically from the implementation of central bank auctions, rather than bilateral purchases, developments in the French and German b/c issuance ratios are controlled for using regression analysis. This is because, under the ECB's PEPP, French and German bills are purchased only bilaterally by the respective national central banks (and not using auctions). The following regression model estimates the impact of the auctions by DNB on the Dutch b/c issuance ratio at the level of government auctions:

$$B/C_{i,c,t} = \alpha + \beta_1 Auction_{c,t}^{DNB} + \beta_2 Stress_{c,t} + \beta_3 Allotted_{c,t-1} + \varepsilon_{i,c,t} \quad (1)$$

where $B/C_{i,c,t}$ is the b/c ratio in the regular auctions of the selling issuer (normalized on the basis of their country-specific average before the start of the DNB auctions, so as to facilitate the interpretation of the results), $Auction_{c,t}^{DNB}$ represents the auctions by DNB, indicated by a dummy that turns one after April 2020 for the Netherlands, but remains zero throughout the sample for France and Germany, $Stress_{c,t}$ is an estimate of market stress, measured as the spread between the average yield of the outstanding bills and the 6-month OIS rate, $Allotted_{c,t-1}$ reflects, at the auction-level, the average of the second and third lag of the total amount allotted by the government in the auction of bill issuance, $\varepsilon_{i,c,t}$ is the error term and the subscripts i, c and t denote the government auction, country and all issuance dates in from January 2019 until January 2021, respectively. The regressions control for allotted amount and market stress since the government issued relatively more debt at the start of the COVID-19 crisis, a period that was characterized by significant markets stress, which may have impacted the b/c ratio at issuance. To prevent a potential simultaneity bias, this paper uses lagged data when controlling for the allocated amount at issuance, as the denominator of the dependent variable is also based on the bill-specific allotted amount.

The results suggest that purchasing bills using auctions rather than bilaterally increases competition at the primary issuance of bills (Table 2). More specifically, the estimations indicate that central bank auctions increase the b/c ratio by 23 to 25 percent (the dependent variable is normalized on the basis of the country-specific average before the start of the DNB auctions). The effects are statistically significant at the 1% level using robust standard errors. The estimated impact of the auction dummy is larger than the average increase in the Dutch b/c ratio after the start of the DNB auctions shown in Figure 1, in part reflecting the reduction in the b/c ratio for the issuance of

Table 2: Central bank auctions effect on primary issuance bid-to-cover

Regressors	1	2
Auctions (dummy)	0.25***	0.23***
	(0.02)	(0.02)
Market stress	-0.47**	-0.39
	(0.24)	(0.26)
Average allotted amount past issuance		-0.08**
		(0.03)
DE included in control group	Yes	Yes
FR included in control group	Yes	Yes
R-sqr	0.08	0.09
N (incl. issuance in DE and FR)	472	456

Notes: The dependent variable is the b/c ratio in the primary issuance auctions of bills. The data cover all Dutch, French and German primary issuances from January 2019 to January 2021 (at the transaction-level). To better compare the government auctions of bill issuance across jurisdictions, the b/c ratios are normalized on the basis of their country-specific average during the period before the start of the DNB auctions. Constant not shown. Significance levels: * p<0.1, ** p<0.05, *** p<0.01.

bills in France after the start of the crisis (see also Table 1), where the central bank has only purchased bills bilaterally.[10]

The previous results indicate that central bank auctions promote competition at issuance. An augmented version of model (1) sheds more light on whether auctions can restore market functioning in times of stress:

$$B/C_{i,c,t} = \alpha + \beta_1 Auction_{c,t}^{DNB} * Stress_t^{high} + \beta_2 Auction_{c,t}^{DNB} + \beta_3 Stress_t^{high} + \beta_4 Allotted_{c,t-1} + \varepsilon_{i,c,t} \quad (2)$$

where $Stress_t^{high}$ is a dummy variable that indicates when the bill-OIS spread is below or above the countries' 75th percentile.[11] The 75th percentile of the countries' bill-OIS

[10] A separate robustness check shows that the impact of central bank auctions on the b/c ratio decreases to 11 percent when estimating model (1) using a data sample that excludes developments in the primary market of French bills. However, the effect remains statistically significant at the 1% level, thus validating the finding that central bank auctions increase competition at bill issuance (available upon request).

[11] The results are robust to including a dummy variable that indicates when the bill-OIS spread is

spread is -0.10, which is relatively similar to the Dutch bill-OIS spread median of -0.094. Figure A1 in the Appendix shows that the Dutch bill-OIS spread peaks at the start of the COVID-19 crisis and remains above the 75th percentile for most of the summer months in 2020.

The results indicate that central banks can improve the functioning of the bill market in a liquidity crisis by purchasing bills using auctions rather than bilaterally. In times of stress, central bank auctions increase the b/c ratio by 6 percent, in addition to an already positive effect on the b/c ratio of 20 percent (Table 3). The effect of central bank auctions in times of market stress is significant at the 10% level.

Table 3: Central bank auctions effect on primary issuance bid-to-cover in times of stress

Regressors	1
Auctions (dummy)	0.20***
	(0.02)
Auctions in times of stress (dummies interacted)	0.06*
	(0.04)
Market stress (dummy)	-0.06*
	(0.03)
Average allotted amount past issuance	-0.08**
	(0.03)
Issuance in DE and FR included in control group	Yes
R-sqr	0.09
N (incl. issuance in DE and FR)	456

Notes: See Table 2.

below or above the sample median instead of the 75th percentile.

3.2 Impact of issuance on the performance of central bank auctions

The primary issuance of bills is also expected to generate liquidity (and competition) in the central bank auctions. Bills may be offered at larger sizes and lower prices right after the government's tap issuance, due to the bills' additional supply.[12] Bills may also be offered more competitively prior to the government's tap issuance, because the government's issuance calendar is pre-announced, allowing market participants to anticipate supply increases in the future (i.e. short selling).

To investigate whether bills are offered more competitively near primary issuance, this paper focuses on bills that are offered in central bank auctions within 7 days before or after a tap issuance.[13] What supports the idea that bills are offered more competitively near issuance is that, in the sample, half of the offer amounts in the central bank auctions represent bills that are less than 7 days away from a tap issuance, while these bills represent only a quarter of the total outstanding amount. The following regressions gauge whether bills near a tap issuance are offered at different sizes and for different prices than bills further away from issuance:

$$Offer_{i,t}^{amount} = \beta_1 Tapped_{i,t}^{before} + \beta_2 Tapped_{i,t}^{after} + \beta_3 NL/DE_{i,t}^{spread} + Outstanding_{i,t} + \mu_i + \eta_t + \varepsilon_{i,t} \quad (3)$$

$$Offer_{o,t}^{cheapness} = \beta_1 Tapped_{i,t}^{before} + \beta_2 Tapped_{i,t}^{after} + \mu_i + \eta_t + \varepsilon_{o,t} \quad (4)$$

where $Offer_{i,t}^{amount}$ is the sum of the offer amounts of the specific bill in the central bank auction (in EUR millions), $Offer_{o,t}^{cheapness}$ is an indicator of the cheapness of

[12] A tap issuance involves the issuance of a bill under the same conditions as a previous bill (where the 'tapped' bill carries the same ISIN as the previously issued bill).

[13] Due to blackout rules related to the prohibition of monetary financing, the Eurosystem does not purchase bills that are very near their issuance and bills that have a remaining maturity close to the issued bill.

the accepted offer relative to the Dutch bill segment, defined as the difference between the accepted yield price and the average yield of all eligible bills on the day of the auction, $Tapped_{i,t}^{before}$ and $Tapped_{i,t}^{after}$ are dummies that equal one when the primary issuance of the offered bill is within 7 days before or after the central bank auction, respectively, and zero otherwise, $NL/DE_{i,t}^{spread}$ represents an indicator of the cheapness of the offered bill relative to the German bill segment (in which no auctions are being implemented), defined as the spread between the average yield of offers of the same bill and the average yield of German bills, $Outstanding_{i,t}$ is the outstanding amount of the offered bill (excl. DNB purchases), μ_i are instrument fixed effects (i.e. ISIN dummies), η_t are time dummies for each auction date (multiple transactions took place during each auction) and the subscripts i, o and t denote the ISIN, allocated offer (an ISIN can be offered multiple times within the same auction) and auction date, respectively.

The results show that bills are offered at larger sizes when they are within 7 days before or after a tap issuance. Of these bills, the total offer amount per auction lies approximately EUR 440 to EUR 500 million higher than of bills further away from issuance, independent of whether the auction is held before or after issuance (Table 4). The effects are statistically significant at the 1% level using robust standard errors. Bills near a tap issuance are also offered at lower prices in the central bank auctions. Accounting for the average indicative mid-market yield of the universe at time of purchase, the accepted offer yields of bills that are issued within a week before or after the central bank auction lie about 0.4-0.9 and 0.2-0.7 basis points higher than the accepted offer yields of bills further away from issuance (Table 5). The statistical significance of these effects varies between the 1% and 10% level. A separate robustness check shows that the results are statistically similar when the yields of unaccepted offers are included in the sample (available upon request).

Table 4: Issuance effect on offer amount (mln) in central bank auctions

Regressors	1	2	3
Issued before auction (dummy)	495.50***	440.14***	437.28***
	(97.83)	(80.06)	(82.20)
Issued after auction (dummy)	503.73***	474.14***	444.40***
	(98.59)	(93.81)	(75.53)
NL - DE yield spread (in bps)	0.00	0.01*	0.01*
	(1.09)	(0.76)	(0.70)
Outstanding amount (excl. purchases)	-0.02	-0.07***	0.02
	(0.02)	(0.02)	(0.01)
Auction fixed effects	No	No	Yes
Instrument fixed effects	No	Yes	No
R-sqr	0.37	0.49	0.71
N	167	167	167

Notes: The dependent variable is the sum of the offer amounts of a specific bill in the central bank auction. The number of observations reflects the number of offered ISINs, summed for all auctions in 2020. See also Table 2.

Table 5: Issuance effect on bill cheapness (bp) in central bank auctions

Regressors	1	2	3
Issued before auction (dummy)	0.89***	0.70***	0.39*
	(0.19)	(0.18)	(0.24)
Issued after auction (dummy)	0.26**	0.16*	0.67***
	(0.13)	(0.10)	(0.20)
Auction fixed effects	No	No	Yes
Instrument fixed effects	No	Yes	No
R-sqr	0.08	0.42	0.61
N	338	338	338

Notes: The dependent variable is the difference between the accepted yield price in the central bank auction and the average yield of all eligible bills on the day of the auction. The number of observations reflects the total number of accepted offers in all the auctions in 2020. See also Table 2.

4 Conclusion

Monetary operations matter. The implementation of central bank auctions can restore bill market functioning during a liquidity crisis. The findings in this paper indicate that purchasing bills using auctions rather than bilaterally increases the bid-to-cover ratio at bill issuance, especially during stress episodes. Moreover, using auctions as an execution method of asset purchases, central banks can effectively compare different offers simultaneously. This enables the efficient purchase of large bill volumes and allows for scaling up fast when necessary. Indeed, bills are found to be offered more competitively and at larger sizes in central bank auctions on the days before or after a tap issuance. Together, the results suggest that central banks can buttress the monetary policy transmission in times of stress by acting as market makers of last resort using auctions.

In the case of euro area longer-term debt, auctions probably provide less added value compared to bills. This is because the bid-ask spreads (in yield terms) of longer-term debt are relatively tight, reducing the potential for enhanced execution. Moreover, required dealer margins may be more sizable for auctions, due to the larger price volatility and interest rate risk associated with longer-term debt instruments. In addition, the favourable impact of a tap issuance on the competition in central bank auctions is limited when purchasing bonds rather than bills, since longer-term bonds are issued only a few times over their lifespan.

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Appendix

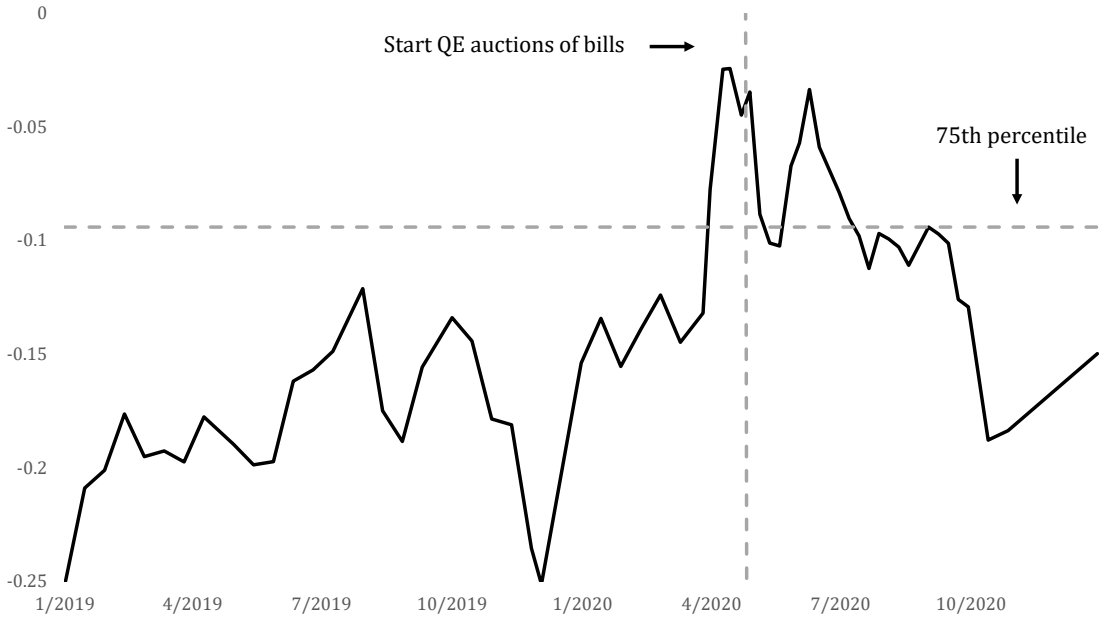

Figure A.1: Developments in the Dutch bill-OIS spread

Notes: This figure shows developments in market stress, indicated by the spread between the average yield of outstanding Dutch bills and the 6-month OIS rate.

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