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STUDY OF GOVERNMENT BOND AUCTION IN INDONESIA & THAILAND AS EMERGING COUNTRIES DURING THE PANDEMIC COVID19: AUCTION CYCLE, UNDERPRICING AND COMPETITIVENESS

Reformadi Prawiro Solideantyo
Universitas Indonesia, Indonesia
Email: reformadips@gmail.com

Abstract

To encourage economic growth, state budgets are typically bigger than anticipated revenues. Due to that reason, to finance these shortfalls (deficits), the government can issue loans bilaterally, multilaterally, or through the issuance of state bonds. When the COVID-19 epidemic expanded broadly and affected the entire globe, the financial markets also exhibited a significant response. Government bonds are the government's principal source of financing, and yield volatility is correlated with debt expenses, therefore the government bond market is large in difficult times. This study examines the empirical study of the auction cycle of government bonds in ASEAN as emerging countries, specifically Indonesia & Thailand and its relationship to the bid-to-cover ratio, exchange rate expectations, local currency, and credit risk pre and during pandemic covid19. According to past research, yields rise toward the auction date, and fall afterward in the secondary market for benchmark tenor samples in each country. The financial data as variables in the market will be using the year 2019-2022 will be processed using the regression data analysis. The study concluded that auction competitiveness reduced secondary market yield on auction day. Yield fluctuation in the secondary market affected by local currency exchange rate forecasts and high credit risk. The modified method from previous research shows a relationship between price changes in the secondary market and when-issued underpricing, indicating that the difference between the auction yield and the secondary market yield is growing, encouraging dealers to quickly secure their profits in the secondary market.

Keyword: Auction Cycle, Government Bonds, Underpricing, Competitiveness (Bid to Cover Ratio), Emerging Markets

Introduction

To achieve economic growth and carry out government operations, a country needs a budget that is typically set annually. This budget consists of revenues and

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expenditures. Revenues come from taxes, duties, grants, and foreign exchange, while expenditures include funds planned by the government for projects such as infrastructure, subsidies, defense costs, government employee salaries and allowances, and so on. Usually, to accelerate economic growth, the government's expenditure budget is larger than the revenue budget. Therefore, to cover budget shortfalls (deficits), the government borrows from other entities through instruments such as bilateral or multilateral loans, or issuing government bonds.

In issuing government bonds, a country can follow policies set by its government. There are several mechanisms commonly used to issue securities, namely through non-competitive or competitive bidding. In the non-competitive instrument, the government provides opportunities for investors to invest through securities with a private placement mechanism. Meanwhile, through the bidding mechanism, the government usually invites investors, both institutional and retail, from domestic and foreign sources, to compete in providing the best bid price represented by primary dealers and investors can determine their bid prices by referring to the prices of bonds to be auctioned in the secondary market as a benchmark.

According to the efficient market hypothesis, the price of an asset reflects all the information available on that asset, thus eliminating arbitrage opportunities. However, the winning bid price at the auction tends to be lower than the price in the secondary market, which is known as underpricing. The theory of common value auctions has developed over the past 50 years to explain the underpricing phenomenon and help predict the extent of underpricing. Vickrey (1961) initially explained the underpricing phenomenon, and subsequent research by Goldreich (2007) proposed a multi-unit multi-bid auction model as a result of assuming that each auction participant would resell the government bonds they won in the auction, leading participants to anticipate this and engage in bid shading.

Research findings on when-issued underpricing have converged, and in the study by Goldreich (2007), it was found that after the United States switched from a discriminatory to a uniform price auction mechanism, the level of underpricing decreased. This proves that the uniform price mechanism is more efficient in government bond auctions and provides savings in terms of government bond issuance (US Treasury). In addition to research on when-issued underpricing, studies on the secondary market response to auctions have also been a focus of research. Studies by Cammack (1991) and Breedon & Ganley (2000) examined the relationship between underpricing in the when-issued market and bond price movements in the secondary market. The research findings indicate that the secondary market reacts to information received from auctions a few days before and after the auctions take place. Thus, underpricing occurs not only in primary market bond auctions but also in observable patterns of price or yield changes in the secondary market.

Lou et al. (2013) conducted comprehensive research and demonstrated that underpricing is part of a larger recurring cycle triggered by auction participants' anticipation and repeated occurrences of government bond auctions. The research findings showed that the secondary market prices of US Treasury bonds experience a significant decline in the five to ten days leading up to the auction but return to normal within five to ten days after the auction. Lou et al. (2013) used the yield differential of specific tenor US Treasury bonds on day t before or after the auction (Y(t)) compared to the yield in the secondary market at the time of the auction (Y(0)). The graph showing the average data over five days before and five days after the auction forms an inverted V-shaped curve as shown below, indicating that auction participants anticipate the repetitive nature of auctions.

Furthermore, Beetsma et al. (2016a) conducted research in response to price pressure during US Treasury auctions, focusing on Italy and Germany as sample countries in Europe. In their study, Beetsma et al. (2016a) identified price pressure cycles as auction cycles, where bond yields in the secondary market exhibit an inverted V-shaped pattern in the days surrounding the auction, similar to what Lou (2013) found. The research findings indicated that auction cycles occur in Italy with larger and more significant yield movements compared to Germany. Beetsma et al. (2016a) further divided the sample into pre-2007 crisis and post-2007 crisis periods. In German auctions, auction cycles were relatively limited both before and after the crisis, while in Italy, the effects of auction cycles were stronger in the post-crisis period compared to the pre-crisis period.

Therefore, this research aims to examine the empirical study of the auction cycle of government bonds in ASEAN as emerging countries, specifically Indonesia & Thailand and adding its relationship to the bid-to-cover ratio, exchange rate expectations, local currency, and credit risk with yield movement in secondary market during pandemic covid19 era in 2019 - 2022.

Research Method

Specifically, the researchers sampled two countries, Indonesia and Thailand, based on several basic similarities in their economic sectors during the COVID-19 pandemic. All historical data used in the study covers the period from 2019 to 2022, which coincides with the duration of the COVID-19 pandemic and obtained from official Central Bank and Minister of finance website for government bonds auction data and Bloomberg and Refinitiv for daily market data. Both countries have the same method of auction which is the discriminatory for reissuance of government bonds throughout 4 benchmark tenor (5Y, 10Y, 15Y, 20Y).The hypotheses proposed are related to the existence of auction cycles and the relationship between these cycles and the success rate of auctions, exchange rate expectations, and credit risk in the primary market of local currency government bonds.

In this analysis, regression is performed using the ordinary least squares (OLS) method with the Newey-West method to obtain more robust results from the regression of sample averages. We also report confidence intervals at the 90% level to allow for visual interpretation of auction cycles. To test significance, we use t-values within the range of t-5 to t+5 (10 days) as per the research by Lou et al. (2013) and Beetsma et al. (2016a).

Results and Discussion

Auction Cycle

The data from the graph depicting the average movements in bond yield changes in the secondary market align consistently with the findings of previous research conducted by Lou et al. (2013) and Beetsma et al. (2016). The graph shows that the average yield changes in the secondary market leading up to the auction day exhibit an increase in yield. However, in Thailand, there is no significant observable downward movement in yield after the government bond auction for the four mentioned maturities.

Bid to cover ratio with secondary market yield movement.

Based on the table below, the results of the equation show that the value of α represents the increase in government bond yield traded in the secondary market during the auction, which is not influenced by the bid-to-cover ratio. The value of β represents the coefficient of the bid-to-cover ratio, where a negative value of β indicates a negative relationship between changes in government bond yield in the secondary market and the bid-to-cover ratio from auction results by investors. The larger the bid-to-cover ratio from the auction results, the smaller the increase in yield in government bonds in the secondary market.

Table 1
Indonesia

	Sample mean deviation		Deviation from the previous auction		Deviation from the four-auction average		Deviation from the average bid-to-cover ratio in the previous year	
	Coefficient	p-value	Coefficient	p-value	Coefficient	p-value	Coefficient	p-value
5 Year α	-0,000267	0.799767	-0,000115	0.9168	0,0000118	0.9913	-0,000136	0.913158
5 Year β	0,000123	0.000637 ***	0,000056	0.0307 *	0,000101	0.0155 *	0,000128	0.000628 ***
Adjusted R^2	11,36%		4,12%		5,35%		15,08%	
10 Year α	-0.001519	0.16360	0.0001899	0.847	0.0001969	0.841	-0.0002151	0.839793
10 Year β	-0.001458	0.00171 **	-0.0002631	0.374	-0.0007440	0.222	-0.0016350	0.000119 ***
Adjusted R^2	9,52%		0,89%		0,57%		19,03%	
15 Year α	0,00105	0.158	0.0010165	0.160	0.0010183	0.159	0.0014516	0.118

15 Year β	0,000052	0.842	-0.0001807	0.352	-0.0003030	0.332	-0.0003841	0.192
Adjusted R^2	0,045%		0,98%		1,07%		1,11%	
20 Year α	0,000954	0.0702 .	0,00097	0.0632 .	0,00096	0.0661.	0,00065	0.313
20 Year β	-0,000009	0.9224	0,000058	0.4836	-0,000011	0.9298	-0,00003	0.766
Adjusted R^2	0,01%		0,56%		0,009%		0,14%	

Note: The estimation method used is Ordinary Least Square (OLS) with fixed effects. The symbols •, *, **, *** indicate significance levels in ascending order at 90%, 95%, 99%, and 99.9% respectively.

Table 2
Thailand

	Sample mean deviation		**Deviation from the previous auction**		**Deviation from the four-auction average**		**Deviation from the average bid-to-cover ratio in the previous year**	
	Coefficient	**p-value**	**Coefficient**	**p-value**	**Coefficient**	**p-value**	**Coefficient**	**p-value**
5 Year α	0.010715	0.0715 .	0.011093	0.0638 .	0.010715	0.0635 .	0.015363	0.0435 *
5 Year β	-0.013630	0.0668 .	-0.012087	0.0277 *	-0.016368	0.0289 *	-0.011907	0.1381
Adjusted R^2	10.12%		16.54%		15.58%		6.89%	
10 Year α	0.005218	0.1238	0.004944	0.206	0.005174	0.186	0.003158	0.505
10 Year β	0.009491	0.0332 *	0.004602	0.232	0.001285	0.802	-0.002447	0.644
Adjusted R^2	21.94%		3.61%		0.4%		2.48%	
15 Year α	0.003252	0.5481	0.001135	0.72807	0.003252	0.28176	0.014681	0.409
15 Year β	-0.015049	0.0162 *	-0.009476	0.00405 **	-0.017984	0.00119 **	-0.016083	0.220

Adjusted R^2	74.94%		94.06%		93.04%		77%	
20 Year α	0.003603	0.3067	0.005065	0.215	0.003198	0.441	0.004503	0.319
20 Year β	-0.008379	0.0775 .	-0.004011	0.275	-0.002924	0.696	-0.007964	0.123
Adjusted R^2	18.86%		2.94%		1.44%		17.95%	

Note: The estimation method used is Ordinary Least Square (OLS) with fixed effects. The symbols •, *, **, *** indicate significance levels in ascending order at 90%, 95%, 99%, and 99.9% respectively.

In this study, significant regression results were found for the 5-year tenor in both Indonesia and Thailand. These findings are consistent with Forest's (2012) research, which indicates that regression against deviations in the bid-to-cover ratio in US government bond auctions is significantly related to yield movements in the secondary market for the 5-year tenor. The regression results are also consistent with the findings of Beetsma et al. (2018) for the 5-year and 10-year tenors, showing partial consistency for the 15-year tenor but inconsistency for the 20-year tenor.

Bid to cover ratio with secondary market yield movement & 1Y forward rate.

Table 3
Indonesia

	Sample mean deviation		**Deviation from the previous auction**		**Deviation from the four-auction average**		**Deviation from the average bid-to-cover ratio in the previous year**	
	Coefficient	**p-value**	**Coefficient**	**p-value**	**Coefficient**	**p-value**	**Coefficient**	**p-value**
5 Year α	-0,000584	0.59687	-0,00042	0.7171	-0,000295	0.7959	-0,00054	0.68640
5 Year β	0,00012	0.00102 **	0,000052	0.0526 .	0,000096	0.0257 *	0,00013	0.00104 **
5 Year γ	0,026	0.49926	0,02	0.6221	0,023	0.5681	0,01654	0.68872
Adjusted R^2	11,03%		3,16%		4,54%		14,37%	
10 Year α	-0.002159	0.07824 .	-0.0005236	0.636	-0.0004839	0.661	-0.0005552	0.66655

10 Year β	-0.001485	0.00503 **	-0.0003498	0.295	-0.0006968	0.342	-0.0016007	0.00199 **
10 Year γ	0.0014684	0.97842	-0.0243975	0.669	-0.0243770	0.670	0.0015197	0.98002
Adjusted R^2	7,72%		1,56%		0,97%		14,27%	
15 Year α	-0.000572	0.514	-0.0004137	0.605	-0.0004398	0.582	-0.0005811	0.616
15 Year β	-0.000154	0.664	-0.0003023	0.289	-0.0005153	0.247	-0.0003466	0.418
15 Year γ	0.0605318	0.266	0.0590221	0.275	0.0590834	0.273	0.0716100	0.300
Adjusted R^2	2,09%		0,58%		0,89%		3,93%	
20 Year α	-0.000352	0.6477	0,00054	0.349	0.0005253	0.365	0.0002953	0.7016
20 Year β	-0.000591	0.0906 .	-0,000081	0.787	-0.0002878	0.524	-0.0006670	0.0662 .
20 Year γ	0.0397058	0.3056	0,0414	0.304	0.0377558	0.351	0.0311405	0.5148
Adjusted R^2	3,33%		2,03%		2,55%		5,08%	

Note: The estimation method used is Ordinary Least Square (OLS) with fixed effects. The symbols •, *, **, *** indicate significance levels in ascending order at 90%, 95%, 99%, and 99.9% respectively.

Table 4
Thailand

	Sample mean deviation		**Deviation from the previous auction**		**Deviation from the four-auction average**		**Deviation from the average bid-to-cover ratio in the previous year**	
	Coefficient	**p-value**	**Coefficient**	**p-value**	**Coefficient**	**p-value**	**Coefficient**	**p-value**
5 Year α	0.008783	0.1180	0.009015	0.1049	0.008935	0.1056	0.012377	0.0901 .
5 Year β	-0.010781	0.1264	-0.010883	0.0325 *	-0.012952	0.0739 .	-0.009808	0.1992

5 Year γ	0.043040	0.0534 .	0.044483	0.0377 *	0.039636	0.0718 .	0.042526	0.0925 .
Adjusted R^2	21%		29.15%		24.09%		16.95%	
10 Year α	0.005332	0.1315	0.005450	0.181	0.005276	0.197	0.003853	0.451
10 Year β	0.009489	0.0395 *	0.005732	0.180	0.001072	0.843	-0.002444	0.657
10 Year γ	0.006299	0.7835	0.019819	0.476	0.005265	0.847	0.015978	0.569
Adjusted R^2	16.83%		0.33%		0.71%		6.59%	
15 Year α	0.002678	0.5978	0.0009838	0.8301	0.003482	0.28997	0.0008106	0.8794
15 Year β	-0.015484	0.0207 *	-0.0094522	0.0234 *	-0.018592	0.00428 **	-0.0167199	0.0882 .
15 Year γ	-0.020346	0.2727	-0.0013263	0.9388	0.008158	0.45120	-0.0529051	0.1742
Adjusted R^2	79.1%		91.12%		92.57%		94.47%	
20 Year α	0.002398	0.500	0.003745	0.370	0.001588	0.708	0.003621	0.465
20 Year β	-0.008171	0.081 .	-0.004105	0.262	-0.004433	0.554	-0.007169	0.196
20 Year γ	-0.012675	0.247	-0.012740	0.294	-0.014734	0.249	-0.007418	0.582
Adjusted R^2	22.46%		5.24%		14.27%		10.49%	

Note: The estimation method used is Ordinary Least Square (OLS) with fixed effects. The symbols •, *, **, *** indicate significance levels in ascending order at 90%, 95%, 99%, and 99.9% respectively.

In this context, α represents the direct impact of the auction itself on yields in the secondary market. β depicts the influence of auction competitiveness on yield changes in the secondary market, with higher levels of competition exerting greater pressure on yields. Meanwhile, γ reflects the impact of fluctuations in the USD-to-local currency exchange rate on yields in the secondary market. The regression results show that by including the variable of changes in the forward exchange rate of the local currency to USD with a 1-year tenor, this model reveals an increase in the t-statistics for the β coefficient. The magnitude of the coefficient remains relatively consistent across the regression results for the 5-year and 10-year tenors in both sampled countries.

In both sampled countries, the α level, which is relatively similar to the previous regression, indicates consistency in positive yield changes in the secondary market on the day of the auction. The β coefficient also remains consistent with a negative and consistently significant value, indicating that higher levels of competition result in smaller yield changes in the secondary market. Furthermore, the γ value is positive, indicating that an increase in the USD value relative to the local currency or a weakening of the local currency against the USD leads to an increase in forward rates. This, in turn, impacts an increase in yields in the secondary market on the day of the auction.

Bid to cover ratio with secondary market yield movement & credit default swap..

Table 5
Indonesia

	Sample mean deviation		**Deviation from the previous auction**		**Deviation from the four-auction average**		**Deviation from the average bid-to-cover ratio in the previous year**	
	Coefficient	**p-value**	**Coefficient**	**p-value**	**Coefficient**	**p-value**	**Coefficient**	**p-value**
5 Year α	0,00032	0.7937	0,00018	0.8914	0.0004681	0.71531	0.0002724	0.851033
5 Year β	0,00016	0,000087 ***	0,000064	0.0223 *	0.0001255	0.00673 **	0.0001592	0.000242 ***
5 Year θ	0,0712	0.0305 *	0,035	0.2895	0.0478770	0.15306	0.0617965	0.082445 .
Adjusted R^2	17,12%		4,64%		7,38%		19,38%	
10 Year α	-0.001863	0.1502	-0.0004094	0.7310	-0.0003994	0.7383	-0.0005186	0.7085
10 Year β	-0.001316	0.0109 *	-0.0003754	0.2423	-0.0006817	0.3364	-0.0013384	0.0089 **
10 Year θ	0.0665472	0.0259 *	0.0740764	0.0172 *	0.0714764	0.0219 *	0.0567552	0.0732 .
Adjusted R^2	14,46%		7,28%		6,63%		16,99%	
15 Year α	0.0006251	0.52071	0,00021	0.80727	0,000196	0.81905	-0.0003512	0.7691
15 Year β	0.0003724	0.38001	-0,0000009	0.99756	-0,000088	0.86707	0.0001634	0.7593
15 Year θ	0.0656731	0.00452 **	0,067	0.00369 **	0,068	0.00363 **	0.0629241	0.0163 *

Adjusted R^2	12,05%		10,84%		10,88%		10,09%	
20 Year α	-0.000412	0.650	0.0006889	0.306	0.000607	0.366	0.0003271	0.713
20 Year β	-0.000639	0.110	-0.0004058	0.221	-0.0004754	0.316	-0.0006540	0.110
20 Year θ	0.0173637	0.309	0.0199531	0.256	0.0181360	0.299	0.0102978	0.583
Adjusted R^2	2,69%		0,72%		3,43%		2,80%	

Note: The estimation method used is Ordinary Least Square (OLS) with fixed effects. The symbols •, *, **, *** indicate significance levels in ascending order at 90%, 95%, 99%, and 99.9% respectively.

Table 6
Thailand

	Sample mean deviation		**Deviation from the previous auction**		**Deviation from the four-auction average**		**Deviation from the average bid-to-cover ratio in the previous year**	
	Coefficient	**p-value**	**Coefficient**	**p-value**	**Coefficient**	**p-value**	**Coefficient**	**p-value**
5 Year α	0.011468	0.1506	0.014816	0.0741 .	0.009560	0.2169	0.01790	0.101
5 Year β	-0.021966	0.0524 .	-0.012639	0.0502 .	-0.026529	0.0244 *	-0.02144	0.132
5 Year θ	0.180161	0.3475	0.186248	0.3407	0.153834	0.4040	0.22544	0.343
Adjusted R^2	17.08%		18.27%		23.74%		12.97%	
10 Year α	0.005489	0.07640 .	0.004493	0.304	0.004900	0.276	-0.001817	0.847
10 Year β	0.014240	0.00198 **	0.006304	0.118	0.00551	0.424	-0.004738	0.717
10 Year θ	0.268652	0.03457 *	0.159423	0.311	0.198867	0.316	0.139998	0.528
Adjusted R^2	54.28%		13.13%		9,84%		18,47%	
15 Year α	0.004589	0.5276	0.0009127	0.839	0.003858	0.33414	0.003000	0.813
15 Year β	-0.016236	0.0502 .	-0.0093874	0.027 *	-0.018484	0.00705 **	-0.012052	0.231

15 Year θ	0.128418	0.7065	-0.0231295	0.902	0.058250	0.73088	-0.108330	0.835
Adjusted R^2	68.4%		91.17%		91.14%		32.38%	
20 Year α	0.003989	0.510	0.006899	0.371	0.006166	0.295	-0.005346	0.735
20 Year β	-0.009050	0.334	-0.002770	0.788	-0.012116	0.309	-0.029783	0.249
20 Year θ	0.046134	0.915	-0.118416	0.787	-0.080556	0.838	-0.097345	0.939
Adjusted R^2	16.84%		3.43%		18.35%		0.72%	

Note: The estimation method used is Ordinary Least Square (OLS) with fixed effects. The symbols •, *, **, *** indicate significance levels in ascending order at 90%, 95%, 99%, and 99.9% respectively.

The positive coefficient θ in both sampled countries indicates that when the credit risk of the issuing country increases, the yield changes in the secondary market on the day of the auction also become larger. The regression analysis findings suggest that when the variable of credit risk changes, measured by the level of Credit Default Swap (CDS) 5-Year, is included, a significant portion of the β coefficients in the auction model with a 5-Year, 10-Year, and 15-Year tenor exhibit significant levels of significance different from zero. This indicates a significant relationship between changes in credit risk and yield changes in the secondary market in the context of auctions for bonds with these tenors. Additionally, it suggests that yields in the secondary market reflect changes in the credit risk of the issuing country.

Overall, the significance of the coefficient for the credit risk variable is consistent with the findings of Beetsma et al. (2018) and Gonzalez-Hermosillo (2008), which state that CDS serves as a proxy for representing the credit risk of a country. Additionally, the significance of the coefficient for the competition variable confirms the findings of previous regressions, which suggest that competition level has a significant influence on the yield changes of government bonds in the secondary market.

Bid to cover ratio with secondary market yield movement & underpricing

Table 7
Secondary Market

Indonesia	**UP = yA - yT**	
	Coefficient	**p-value**
5 Year λ	0.003135	0.00697 **
5 Year μ	-0.133186	0,0000006 ***
Adjusted R^2	23,54%	
10 Year λ	0.0031862	0.00138 **

10 Year μ	-0.1487679	0,00000004 ***
Adjusted R^2	28,01%	
15 Year λ	0.00195	0.01330 *
15 Year μ	-0.044883	0.00814 **
Adjusted R^2	6,64%	
20 Year λ	0.0011703	0.0254 *
20 Year μ	-0.0089590	0.0475 *
Adjusted R^2	3,34%	
Thailand	UP = yA - yT	
	Coefficient	p-value
5 Year λ	0.010203	0.0803 .
5 Year μ	-0.071053	0.4773
Adjusted R^2	2.22%	
10 Year λ	-0.001760	0.859
10 Year μ	0.462611	0.049 *
Adjusted R^2	18.33%	
15 Year λ	0.003544	0.601
15 Year μ	0.001607	0.989
Adjusted R^2	0.0005%	
20 Year λ	-0.0006853	0.887
20 Year μ	0.0433277	0.416
Adjusted R^2	6,10%	

Based on the above regression results, it can be observed that the yield changes of government bonds in the secondary market during the auction day have a significant relationship with underpricing measurements in Indonesia for all tenors at confidence levels ranging from 95% to 99%. In Thailand, this relationship is significant only for the 5-year tenor at a 90% confidence level, aligning with the research methodology of Goldstein (1962) and Cammack (1991).

In regressions with significant μ values, there is also a positive and significant λ value for Indonesia across all four tenors at confidence levels ranging from 95% to 99%, while for Thailand, it is significant only for the 10-year tenor at a 95% confidence level. This indicates that the yield changes of government bonds in the secondary market during the auction day have a larger magnitude compared to the yield differences obtained in the auction relative to the previous day's closing yield or the average yield of government bonds in the secondary market on the day before and during the auction.

Furthermore, the influence of competition level on the changes in bond yields in the secondary market within the underpricing control framework in the equation above is demonstrated through regression analysis with the following results:

Table 8
Indonesia

	Sample mean deviation		**Deviation from the previous auction**		**Deviation from the four-auction average**		**Deviation from the average bid-to-cover ratio in the previous year**	
	Coefficient	**p-value**	**Coefficient**	**p-value**	**Coefficient**	**p-value**	**Coefficient**	**p-value**
5 Year α	0,0025	0.0342 *	0,0028	0.0155 *	0,0029	0.0128 *	0,0027	0.05467 .
5 Year β	0,000058	0.1051	0,000028	0.2327	0,000043	0.2699	0,000063	0.097314 .
5 Year κ	-0,113	0,00008 ***	-0,125	0,0000049 ***	-0,124	0,00000821 ***	-0,11	0.000547 ***
Adjusted R^2	24,95%		23,79%		23,74%		28,35%	
10 Year α	0.0017566	0.1191	0.0031394	0.00181 **	0.0031131	0.00176 **	0.0026384	0.01606 *
10 Year β	-0.000957	0.0196 *	-0.000102	0.68483	-0.000599	0.24714	-0.0011035	0.00294 **
10 Year κ	-0.135286	0,00000045 ***	-0.147668	0,0000007 ***	-0.147400	0,00000005 ***	-0.133772	0,000004 ***
Adjusted R^2	31,58%		27,33%		28,29%		40,93%	
15 Year α	0.0020520	0.01224 *	0.0019348	0.01455 *	0.0019331	0.01463 *	0.0019853	0.0393 *
15 Year β	0.0001220	0.62651	-0.000149	0.42783	-0.000244	0.42015	-0.000269	0.3606
15 Year κ	-0.045726	0.00762 **	-0.044038	0.00967 **	-0.043883	0.00996 **	-0.037782	0.0674 .

Adjusted R^2	5,83%		6,25%		6,28%		4,71%	
20 Year α	0.0020520	0.01224 *	0,0012	0.0252 *	0,0012	0.0261 *	0,00086	0.190
20 Year β	0.0001220	0.62651	0,000057	0.4912	0,000015	0.9015	-0,000007	0.947
20 Year κ	-0.045726	0.00762 **	-0,0089	0.0491 *	-0,00902	0.0486 *	-0,0074	0.136
Adjusted R^2	5,83%		2,76%		2,24%		0,57%	

Note: The estimation method used is Ordinary Least Square (OLS) with fixed effects. The symbols •, *, **, *** indicate significance levels in ascending order at 90%, 95%, 99%, and 99.9% respectively.

Table 9
Thailand

	Sample mean deviation		**Deviation from the previous auction**		**Deviation from the four-auction average**		**Deviation from the average bid-to-cover ratio in the previous year**	
	Coefficient	**p-value**	**Coefficient**	**p-value**	**Coefficient**	**p-value**	**Coefficient**	**p-value**
5 Year α	0.011573	0.0841 .	0.011296	0.0646 .	0.012070	0.068 .	0.002187	0.711
5 Year β	-0.002777	0.6472	-0.004205	0.2824	-0.004024	0.508	-0.002927	0.995
5 Year κ	-0.104284	0.4058	-0.124492	0.2550	-0.116329	0.343	-0.001390	0.891
Adjusted R^2	3.12%		7.9%		4.19%		0.16%	
10 Year α	-0.001794	0.8606	-0.0002047	0.9852	-0.0007563	0.9403	0.003405	0.823
10 Year β	0.002691	0.7885	-0.0034951	0.6746	0.0084318	0.4403	0.015183	0.285
10 Year κ	0.463794	0.0563 .	0.4421512	0.0799 .	0.4171067	0.0862 .	0.487185	0.138
Adjusted R^2	12.96%		9.97%		16.27%		16.94%	

15 Year α	0.0032636	0.705	0.005087	0.641	0.0036617	0.676	0.004351	0.643
15 Year β	-0.000557	0.933	-0.000136	0.976	0.0002447	0.974	-0.002437	0.693
15 Year κ	0.0114756	0.950	0.024790	0.912	-0.0025146	0.989	0.058307	0.752
Adjusted R^2	0.28%		1.02%		0.05%		10.31%	
20 Year α	0.0032636	0.705	-0.002251	0.663	-0.001079	0.836	-0.003646	0.616
20 Year β	-0.000557	0.933	0.004524	0.227	-0.002233	0.752	0.003234	0.565
20 Year κ	0.0114756	0.950	0.063658	0.274	0.044677	0.424	0.125248	0.288
Adjusted R^2	0.28%		3.31%		7.08%		16.55%	

Note: The estimation method used is Ordinary Least Square (OLS) with fixed effects. The symbols •, *, **, *** indicate significance levels in ascending order at 90%, 95%, 99%, and 99.9% respectively.

Based on the previously mentioned regression results, it can be observed that the competition level still has a significant influence on the changes in bond yields in the secondary market on auction days. In this context, the variable of underpricing is used, measured based on the method proposed by Cammack (1991). The analysis results indicate that underpricing has a significant effect on the changes in bond yields in the secondary market on auction days for all four tenors in Indonesia, but not significant in Thailand.

However, there are some differences in both countries with negative coefficient values κ, indicating that underpricing acts as a reducing factor for the changes in bond yields in the secondary market on auction days. In other words, the larger the underpricing, the greater the changes in bond yields in the secondary market. When connecting it with the previously mentioned regression results, the negative value of κ provides an interpretation that a larger underpricing, which can be explained by increased information dispersion, actually reduces the magnitude of changes in bond yields in the secondary market. However, the κ value shows significance in Indonesia, indicating that the difference in yields achieved in auctions compared to the closing yield the day before affects the changes in bond yields in the secondary market on auction days.

Conclusion:

The research conducted on the pattern of yield movements in the secondary market before and after auctions (auction cycle) indicates that in Indonesia and Thailand, there is an increasing trend in yields five days before the auction. Although there is variation in the pattern of yield decreases five days after the auction, most research findings indicate a decline in yields after the auction takes place.

When the demand for the won bonds increases, the competition to acquire those bonds also intensifies. As a result, auction participants are motivated to make purchases from the secondary market to meet the demand. However, this relationship cannot be consistently explained in benchmark bond auctions with a 20-year tenor, as well as in some other regressions involving those benchmark bonds. This is due to irregular auction frequency and long intervals between auctions.

Based on the proposed hypothesis, there is a relationship between expectations of the local currency exchange rate and competition level in auctions with changes in government bond yields in the secondary market on the auction day. If there is an expectation that the local currency will depreciate against the US Dollar (USD), the increase in yields in the secondary market will be greater. Conversely, if there is an expectation of currency appreciation, the increase in yields in the secondary market will be reduced.

Based on the proposed hypothesis, there is a relationship between credit risk level and competition level in auctions with changes in government bond yields in the secondary market on the auction day. Increasing credit risk level becomes a consideration for investors in the secondary market to increase the risk premium on market yields. In this context, the higher the credit risk level associated with government bonds, the higher the expected risk premium by investors. This risk premium reflects the additional compensation required by investors in return for the possibility of default or the government's inability to meet bond payment obligations. Thus, credit risk level can influence changes in government bond yields in the secondary market on the auction day. Investors will tend to demand higher yields to compensate for higher credit risk, leading to an increase in yields in the secondary market.

The research findings regarding the relationship between changes in government bond yields in the secondary market on the auction day and when-issued underpricing, using the measurement method by Cammack (1991), yield results that contradict common intuition. In auctions with a 10-year tenor, there is a significant negative impact between changes in yields in the secondary market and the level of underpricing, which can be explained by information dispersion according to Cammack (1991).

BIBLIOGRAPHY

Ahmad, F., & Steeley, J. M. (2008). Secondary Market Pricing Behaviour around UK Bond Auctions. Applied Financial Economics, 18:9, 691-699.

Amihud, Y., & Mendelson, H. (1991). Liquidity, Maturity, and The Yields on U.S. Treasury Securities. Journal of Finance, vol. 46, 1411-1425.

Ammer, J. F. (2011). Sovereign CDS and bond pricing dynamics in emerging. Journal of International Financial Markets, Institutions & Money, 369-387.

Beetsma, R., Giuliodori, M., Hanson, J., & Jong, F. d. (2016). Domestic and CrossBorder Auction Cycle Effects of Sovereign Bond Issuance in the Euro Area. CEPR Discussion Paper, No.11122.

Beetsma, R., Giuliodori, M., Hanson, J., & Jong, F. d. (2018). Bid-to-cover and yield changes around public debt auctions in the euro area. Journal of Banking and Finance Vol 87, 118-134.

Beetsma, R., Giuliodori, M., Jong, F. d., & Widijanto, D. (2016). Price Effects of Sovereign Debt Auctions in The Euro-Zone: The Role of The Crisis. Journal of Financial Intermediation 25, 30-53.

Berg, K. A., & C.Mark, N. (2018). Global macro risks in currency excess returns. Journal of Empirical Finance Vol 45, 300-315.

Bickhandani, S., & Huang, C.-F. (1989). Auctions with Resale Markets: An Exploratory Model of Treasury Bill Markets. Review of Financial Studies vol. 2, 311-339.

Bissoondoyal-Bheenick, E., Brooks, R., Hum, S., & Treepongkaruna, S. (2011). Sovereign rating changes and realized volatility in Asian foreign exchange markets during the Asian crisis. Applied Financial Economics 21, 997-1003.

Breedon, F., & Joe, G. (2000). Bidding and Information: Evidence from Gilt-Edged Auctions. The Ecomomics Journal vol 110, 963-984.

Brimmer, A. (1962). Price Determination in the United States Treasury Bill Market. Review of Economics and Statistics Vol 44, 178-183.

Cammack, E. (1991). Evidence of Bidding Strategies and The Information in Treasury Bill Auctions. Journal of Political Economy vol. 99, 100-130.

Che, S. F. (2013). Macro-economic Determinants of UK Treasury Bonds Spread. International Journal of Arts and Commerce, 163-172.

De Santis, R. (2014). The Euro Area Sovereign Debt Crisis: Identifying Flight-toLiquidity and the Spillover Mechanisms. Journal of Empirical Finance 37, 150-170.

De Vassal, V. (1998). Time and Seasonal Patterns in The Fixed Income Market. The Journal of Fixed Income 1998.7.4, 7-16.

Ebeke, C., & Y. L. (2015). Emerging market local currency bond yields and foreign holdings – A fortune or misfortune? Journal of International Money and Finance 59, 203-219.

Forest, J. J. (2012). The Effect of Treasury Auction Announcements on Interest Rates: 1990-1999,. Mimeo. Friedman, M. (US Goverment Printing Office). Testimony in Employment, Growth, and Price Levels. Hearings Before The Joint Economic Commitee, 86th Congress, 1st Session, October 26-30, Washington D.C, 3023-3026.

Goldreich, D. (2007). Underpricing in Discriminatory and Uniform-Price Treasury Auctions. Journal of Financial and Quantitative Analysis, vol. 42, 443-466.

Goldstein, H. (1962). The Friedman Proposal For Auctioning Treasury Bills. Journal of Political Economy Vol 70, 386-392.

Khrisna, V. (2010). Auction Theory (Second Edition). Pennsylvania, USA: Elsevier.

Kyle, A. (1989). Informed Speculation with Imperfect Competition. Review of Economic Studies vol 56, 317-356.

Lou, D., Yan, H., & Zhang, J. (2013). Anticipated and Repeated Shocks in Liquid Markets. Review of Financial Studies 26, 1891-1912.

Miyajima, K., Mohanty, M., & Chan, T. (2015). Emerging Market Local Currency Bonds: Diversification and stability. Emerging Markets Review 22, 126–139.

Nyborg, K. G., & Sundaresan, S. (1996). Discriminatory Versus Uniform Treasury Auctions: Evidence from When Issued Transactions. Journal of Financial Economics vol 42, 63-104.

Nyborg, K. G., Rydqvist, K., & Sundaresan, S. (2002). Bidder Behavior in Multiunit Auctions: Evidence from Swedish Treasury Auctions. Journal of Political Economy Vol 110, 394-424.

Nyborg, K., Rydqvist, .. K., & Keluharju, M. (2005). Strategic Behaviour and Underpricing in Uniform Price Auctions: Evidence from Finnish Treasury Auctions. The Journal of Finance vol. 60, 1865-1902.

Safari, M., & M. Ariff. (2015). Sovereign credit rating change in emerging markets and its impact on their financial markets. International Journal of Bonds and Derivatives Vol. 1, 203-216.

Spindt, P., & Stolz, R. (1992). Are US Treasury Bills Underpriced in the Primary Market? Journal of Banking and Finance 16, 891-908.

Spindt, P., & Stolz, R. (2012). The Expected Stop-out Price in a Discriminating Auction. Economics Letters 31, 133-137.

Umlauf, S. R. (1993). An Emprical Study of The Mexican Treasury Bill Auction. Journal of Financial Economics vol. 33, 313-340.

Vickery, W. (1961). Counterspeculation, Auctions and Competitive Sealed Tenders. Journal of Finance vol. 16, 8-37.

Wang, J. D., & Zender, J. F. (2002). Auctioning Divisible Goods. Economic Theory, vol. 19,, 673-705.