

# Piccolo Research

Independent research on blockchain startups and ICO's

## An independent review of **MakerDAO (MKR)**

12 December 2018 - Lennard Neo

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# MAKERDAO (MKR)

## Weak liquidity and restrictive system parameters point to further downside for MakerDAO

### Company Overview

MakerDAO (Decentralized Autonomous Organization) is headquartered in California and was established in 2015. The main vision is to minimise asset volatility through the creation of its stable coin, DAI, allowing anyone equal access to financial services that includes loan offerings. DAI can only be issued through a Collateralised Debt Position (CDP), where ETH is locked up as collateral via a smart contract, in return for a stability fee. In short, a user could collateralise an asset to borrow in DAI.

Concept

MVP

Established

MakerDAO's (Maker) token, MKR, on the other hand, is both a utility and governance token, where the former is required to pay fees for using the platform, and the latter entitles holders to vote on certain changes to the system such as stability fees, the debt ceiling, etc. Maker's structure is touted as one of the most well-thought concepts backed by sound game theory dynamics, which result in DAI being distinctly different from other stable coins as it is truly decentralised and not backed by physical USD stored in a bank account. We further explain several features below:

- **MKR** - The primary token governing DAI's ecosystem. Tokens are burnt with interests and fees awarded from debt issuance, thus increasing the value of MKR
- **DAI** – Maker's stable coin pegged to 1 USD
- **Collateralized Debt Position (CDP)** – The locked-up collateral needed to issue DAI. The collateral amount is fixed at 150% of the loan amount (i.e. for every \$1 borrowed, \$1.50 of collateral is required)
- **Stability Fee** – The fee needed to pay down the debt to close a CDP. It was recently revised from 0.5% to 2.5% in Aug 2018
- **Debt Ceiling** – The maximum amount of debt that can be created by a single collateral CDP
- **Self-stabilising mechanism** – Market forces by arbitrageurs will stabilise DAI prices by maintaining the peg (i.e. DAI holders will sell if the price is above peg or buy when the price is below the peg). Also, a Global Settlement process is implemented as a last resort to shut down the system and unwind outstanding CDPs in the event of an emergency

Currently, the system is running on a single-collateral DAI. However, the team will be pushing out multi-collateral DAI, allowing more assets to be collateralised in the near future.

Sell

Target Price: **\$259.65**  
(-19% downside)

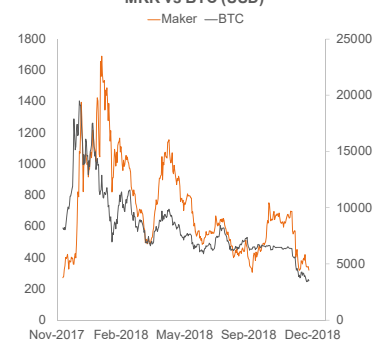
### General

Ticker	MKR
Price (10 Dec 2018)	\$321.91
YTD price range	\$307 - \$1,165
YTD Avg Trading Volume	\$0.85m
Circulating Token Supply	1m
Market Cap (10 Dec 2018)	\$234m

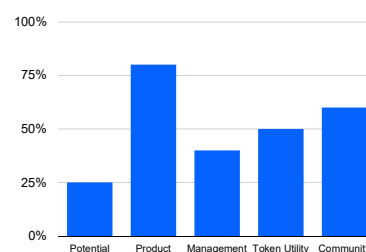
### Platform Information

Token Type	ERC20
Sector	Finance/ Lending
Regional Focus	Global
MKR holders	> 6800
CEO	Rune Christensen
Website	<a href="#">Click Here</a>

MKR vs BTC (USD)



### Birds-Eye View



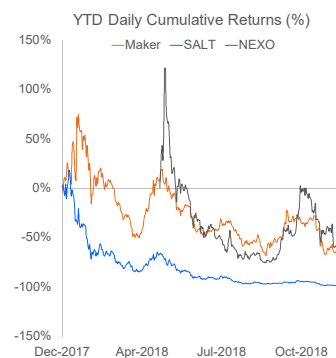
## Thematic Views

**Weaknesses in current stabilisation mechanisms** – One key factor that to maintain DAI's peg to the USD is Maker's notion of stabilisation mechanisms. The nature of Maker's structure does not allow 1 DAI to be redeemable for \$1 unlike Circle's USDC and True USD, where a user can always redeem one token for \$1 from their platforms since the collateral that backs it is in USD instead of ETH. Therefore, Maker has to rely on other stabilising mechanisms derived from general market forces combined with economic theories on supply and demand to maintain the peg. We lay out several mechanisms and its weaknesses that add to MKR's price volatility in the market.

- **Global Settlement** - The option to shut down the system in a black-swan event. This is triggered by global settlers who are elected representative of the platform. If an imminent crash happens, which tend to be fast and big, it will be difficult for the system to buy back outstanding DAI quickly to prevent the platform from becoming under-collateralised. Furthermore, it is unknown if settlers could detect irrationality in the markets quickly enough to act on such events. Hence, the intended effect of deterrence in this mechanism is weaker than what it should be.
- **Self-stabilising mechanism by arbitrageurs** - This mechanism requires market forces to bring the price back to the peg, which is highly dependent on the rationality of users. For example, if a user thinks that DAI could go to \$1.50 in the future, they will have no incentive to open a CDP to issue and sell DAI even if the market price is \$1.25. Eventually, this could add to the volatility rather than reducing it. Furthermore, without the redeemable function as mentioned above, this mechanism will have a lesser effect on the overall stability of the ecosystem.

**Limited scalability of DAI as a stable coin** – There are a couple of parameters within the system that currently limits the scalability of DAI. The first one would be the current debt ceiling of 100m implemented within the system. Even though the debt ceiling is created to minimise downside risk, it sacrifices scalability. In comparison, the overall market cap of major stable coins currently sits at \$2.6b, which is far from DAI's overall market value of \$57m. Our analysts do not foresee the debt ceiling to increase to \$1b in the near future, as the system is unable to assume the substantial downside risks that necessitate stability. Secondly, for DAI to be issued, a CDP has to be opened by a user with backed collateral. There is little or no incentive for users to open CDP aside from the arbitrage opportunities mentioned earlier. Hence, the CDP market relies heavily on and is skewed to borrowers, which currently does not justify a \$1b loan issuance market to support the stable currency. Furthermore, the competitive environment in the lending space with increases Maker's difficulty in acquiring market share. Therefore, the restrictions to scalability deflate the value attributable to MKR tokens, and in turn its price.

**Low trading volume of MKR increases liquidity risk** – Maker currently sits comfortably in the top 30 coins ranked by market cap. However, its 24hr trading volume of \$0.23m pales greatly from an average of \$407m between the 30 coins. MKR's trading volume is one-third that of their closest competitor, SALT. The lack of trading volume translates into substantial liquidity and systematic risks for MKR holders, as they might incur a substantial loss in transaction value when they liquidate or enter into positions. Hence, investors need to be compensated for holding this additional risk. In some instance, illiquidity could cost investors 20% of the token price, and it is important to note that illiquidity increase during bear markets, which is further exacerbated in a black swan event where MKR is liquidated to cover losses.



Stable Coin	Market Cap (\$m)
DAI	\$57m
USDT	\$1,887m
TUSD	\$213m
USDC	\$195m
GUSD	\$89m
PAX	\$173m
<b>Total</b>	<b>\$2,614m</b>

#	Name	Symb ol	Market Cap	Price	Volume (24h)
1	Bitcoin	BTC	60,684m	\$3,484.17	4,812m
2	XRP	XRP	12,450m	\$0.30	405m
3	Ethereum	ETH	9,468m	\$91.28	1,655m
4	Stellar	XLM	2,253m	\$0.12	122m
5	Tether	USDT	1,887m	\$1.02	3,073m
6	Bitcoin Cash	BCH	1,832m	\$104.64	67m
7	EOS	EOS	1,713m	\$1.89	851m
8	Bitcoin SV	BSV	1,610m	\$92.00	60m
9	Litecoin	LTC	1,465m	\$24.61	407m
10	TRON	TRX	889m	\$0.01	55m
11	Cardano	ADA	779m	\$0.03	12m
12	Monero	XMR	739m	\$44.40	13m
13	IOTA	MIOTA	687m	\$0.25	6m
14	NEM	XEM	651m	\$0.07	9m
15	Binance Coin	BNB	619m	\$4.73	14m
16	Dash	DASH	586m	\$68.92	141m
17	Ethereum Classic	ETC	432m	\$4.05	108m
18	NEO	NEO	400m	\$6.15	98m
19	Zcash	ZEC	306m	\$56.46	131m
20	Dogecoin	DOGE	246m	\$0.00	15m
21	Maker	MKR	237m	\$325.36	0.23m
22	Tezos	XTZ	223m	\$0.37	2m
23	TrueUSD	TUSD	213m	\$1.02	31m
24	VeChain	VET	212m	\$0.00	5m
25	Bitcoin Gold	BTG	208m	\$11.98	4m
26	USD Coin	USDC	195m	\$1.03	13m
27	OmiseGO	OMG	185m	\$1.32	23m
28	Ox	ZRX	174m	\$0.32	7m
29	Paxos Standard	PAX	173m	\$1.01	57m
30	Basic Attention	BAT	170m	\$0.14	5m
<b>Average Volume</b>					<b>407m</b>

\*As of 11 Dec 2018. Source: CMC

## Competitor Analysis

Maker's competitors appear on two fronts, the stable coin market and lending sector. Amongst the stable coins, Maker's DAI has the widest price range and highest annualised volatility at 22.5%. Having initiated in 2017, DAI has lost traction against its competitors, such as TrueUSD, Circle's USD Coin, which began in 2018. Even though it has a truly decentralise mechanism, it lacks the direct redeemability feature to 1 USD. A comparison chart with more details is shown below.

Project Name	DAI	Tether	TrueUSD	Circle USD Coin	Gemini USD	Paxos
Symbol	DAI	UDST	TUSD	USDC	GUSD	PAX
Initiation Year	2017	2015	2018	2018	2018	2018
Market Cap	\$57m	\$1,887m	\$213m	\$195m	\$89m	\$173m
Avg Daily Trading Volume (past 30d)	\$7.0m	\$3,800m	\$38m	\$17m	\$6m	\$61m
YTD Price Range	\$0.93 - \$1.06	\$0.97 - \$1.03	\$0.98 - \$1.09	\$0.99 - \$1.04	\$0.99 - \$1.03	\$0.98 - \$1.02
YTD Annualized Volatility	22.5%	11.5%	19.1%	13.2%	19.5%	11.9%
No. of Exchanges traded	16	52	37	20	22	23
No. of Pairs traded	20	105	43	21	11	15
Redeemability to \$1	N	Y	Y	Y	Y	Y
Decentralized	Y	N	N	N	N	N

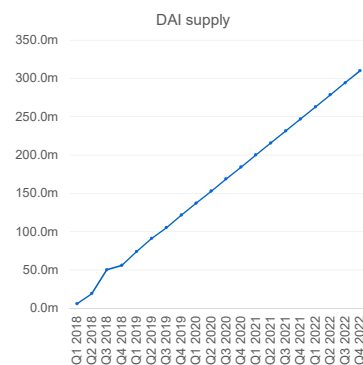
Our analysts cite a couple of Maker's closest competitors within the lending space, namely Salt and Nexo. Maker has one of the best lending rates for DAI in the markets with the highest Loan-To-Value (LTV) ratio. However, it only accepts single collateral (ETH) currently and does not have direct lending to fiat currency without going through a third party. An in-depth comparison chart is shown below.

Project Name	Maker	Salt	Nexo
Infrastructure Type	Lending	Lending	Lending
Symbol	MKR	SALT	NEXO
Inception Year	2015	2016	2017
Country of Domicile	US	US	Switzerland
Token Price	\$321.91	\$0.216	\$0.073
Market Cap (Based on Circulating Supply)	\$234.4m	\$17.5m	\$40.8m
Market Cap (Based on Total Supply)	\$321.9m	\$25.9m	\$72.9m
Avg Daily Trading Volume (30d)	\$0.85m	\$1.11m	\$2.11m
Returns since listing (vs USD)	18%	-95%	-61%
Interest Rate (Ann.)	2.5%	5.99% - 22.25% (varies by amt)	8% (w Nexo) 16% (others)
Collateral Options	ETH	BTC, ETH, LTC, DOGE	BTC, ETH, NEXO, BNB, XRP, TUSD
Repayment Options	DAI	USD	USD, EUR, BTC, ETH, NEXO
Token Value	Voting, Token burn from fees	Voting, Stake for interest rate discounts	Voting, Dividend, Discounts, Asset-backed
Loans Issued	>\$75m	>\$50m (since launch)	\$32m (Credissimo 2017)
Loan to Value	66.67%	30%-50%	20%-50% (depends on collateral type)
Transaction Speed	Instant	Slow (P2P matching mechanism)	Instant

Figures as of 10 Dec 2018, Source: CMC

## Valuation

Maker's fundamental value stems from the burning or deflationary mechanism derived from stability fees (2.5%) and liquidation fees (13%) incurred by users who borrow DAI from the ecosystem. We project DAI's supply into the future using historical growth rates and apply a discount factor using traditional lenders (banks), as we assess the rigidity of DAI's lending ecosystem being comparable to them. It is important to note that DAI's supply is limited by the debt ceiling (100m DAI) as per its current parameter, which in turns impede the valuation of the token. Therefore, our analysts outlined several scenarios based on various ceiling caps and attached probability weights to derive a fair valuation on our future expectations of the token.



From our model, an intrinsic valuation of **\$259.65** per MKR token was derived. The estimates used are conservative as it does not include the value of governance attributed to token holders.

## Key Risks

- Value for governance voting is not accounted for in the model
- Multi-collateral borrowing in other digital currencies or assets has yet to launch. This would increase the DAI's debt ceiling and increase MKR token valuation
- Black swan events, like flash crashes, could lead to heavy liquidation of existing CDPs
- Regulatory uncertainties on cryptocurrency backed loans could create headwinds

Parameters Inputs	Values	Comments
Total Tokens Supply	1m	
Discount Factor Ann	5.0%	Avg Cost of Equity for Banks
Discount Factor Qtr	1.2%	
Stability Fee Ann	2.5%	
Stability Fee Qtr	0.6%	
Liquidation Fee Ann	13.0%	
Liquidation Fee Qtr	3.1%	
Default Rates Ann	3.1%	S&P/Experian Bankcard Default Index
Default Rate Qtr	0.8%	
Terminal Value growth Ann	3.1%	Worldbank Global Growth Rate Projection
Terminal Value growth Qtr	0.8%	
DAI Supply Quarterly Growth Rate Qtr	21.9%	Linear Interpolation since launch
Debt Ceiling (Max DAI to be created)	100m	

As of 10 Dec 2018. Source: MakerDAO, A. Damodaran, S&P, Worldbank

Fundamental Valuation Model	Actual Forecast																		
	Q4 2018	Q1 2019	Q2 2019	Q3 2019	Q4 2019	Q1 2020	Q2 2020	Q3 2020	Q4 2020	Q1 2021	Q2 2021	Q3 2021	Q4 2021	Q1 2022	Q2 2022	Q3 2022	Q4 2022	TV	
(Figures in millions)																			
DAI Supply	55.87	73.97	91.03	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	22,321
<b>Value attributable from</b>																			
Stability Fee		0.46	0.56	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	138.22
Liquidation		0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	5.29
Discount Factor	0.9880	0.9761	0.9643	0.9527	0.9413	0.9300	0.9188	0.9077	0.8968	0.8860	0.8754	0.8648	0.8544	0.8441	0.8340	0.8240			
PV	0.47	0.57	0.62	0.61	0.61	0.60	0.59	0.58	0.58	0.57	0.56	0.56	0.55	0.54	0.54	0.53	0.53	0.53	118.25
Sum of PV		127.32																	
Total Tokens Supply	1,000,000																		
Circulating Tokens Supply	728,228																		
Implied token price (based on 100m DAI Debt Ceiling)																			<b>\$174.83</b>

## Scenario Analysis

Scenarios	DAI Debt Ceiling	Token Price	Weights
Scenario 1	100m	\$174.83	60%
Scenario 2	200m	\$345.48	30%
Scenario 3	300m	\$511.06	10%
<b>Implied Token Price (Weighted Avg)</b>		<b>\$259.65</b>	

## Price Sensitivity Table

		DAI Debt Ceiling (in millions)				
		100	150	200	250	300
Stability Fee	1.5%	107.85	160.89	213.12	264.56	315.26
	2.0%	141.40	210.94	279.42	346.87	413.34
	<b>2.5%</b>	<b>174.83</b>	260.81	345.48	428.87	511.06
	3.0%	208.14	310.50	411.30	510.58	608.42
	3.5%	241.33	360.00	476.88	591.99	705.43

## Conclusion

In conclusion, Pico Research presents a **'Sell'** rating on MKR with a target price of **\$259.65**, which represents a 19% downside. Our analysts believe that the token is trading above its valuation in lieu of the restrictions on several parameters within Maker's ecosystem.

Overall, for the reasons listed below, Pico affirms its rating:

- Fundamental valuation does not justify the current token price of \$321.91, and a doubling of DAI's debt ceiling only justifies a 'hold' valuation
- The absence of a redeemability feature creates volatility in Maker's stabilisation mechanism
- Lack of volume on MKR tokens on exchanges enhance liquidity risk for investors
- DAI displayed the highest volatility compared to other stable coins in the market

Notwithstanding the above, Pico acknowledges several upsides in the project that includes it being truly decentralised and having one of the lowest interest rate offerings. Our analysts further acknowledge that the valuation is based on current parameters (debt ceiling, single collateral, stability fee) of the system, and would revise the figures accordingly should any of these parameters change. In addition, we continue to remain cautious until the launch of multi-collateral DAI as a variety of upgrades will be implemented into the system that could further impact its overall value.

In light of the preceding, we recommend a **'Sell'** rating on MKR token.

## **About the Analyst**

Lennard specializes in fundamental and technical analysis in digital asset investments. He became acquainted with blockchain, cryptocurrency and ICOs in 2016, and recently decided to take a meaningful step away from traditional banking to join this industry. Previously, Lennard spent 3 years with an investment bank in forex and debt capital markets. Prior to this, he also had entrepreneurship experience working with an e-commerce startup and a local social enterprise. Lennard graduated with a master's degree in Applied Finance and is fluent in English, Chinese with a basic in Korean. He is a CFA level III candidate.

## **Ratings Definition**

Monitor – Continue observation until clarity of information is provided

Sell/ Avoid – Investment is associated with high risk of losing capital

Hold/ Neutral – To maintain current levels of position until the next updated release

Spec Buy – A speculative opportunity for investors with higher risk tolerance

Buy – A high conviction buying opportunity

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