

How much should you invest in Marketplace Lending?



Introduction and Key Findings

The goal of this analysis is to determine how much money investors should put in the new asset class named 'Marketplace Lending' or 'Peer Lending'. [Marketplace Lending](#) allows investors to lend money directly to borrowers, and is part of a wave of new Internet-based services that achieve efficiencies through disintermediation.

Marketplace Lending benefits from lower operational expenses than traditional institutions such as banks, which means it can offer both lower rates for borrowers and higher returns for lenders.

In the span of a few years, Marketplace Lending has moved from novelty to the core business of multi-billion dollar concerns, such as [Lending Club](#), [Prosper](#), or [FundingCircle](#).

To determine how much to allocate to this asset class, we compare risks and returns of a classic portfolio with portfolios including Marketplace Lending assets.

The following analysis shows that the risk-returns profiles can be significantly improved by diversifying **13.2% of one's portfolio in Marketplace Lending assets** on average.

Initial Portfolio

The initial, benchmark portfolio is the **All Century Portfolio**, a classic 60% equity / 40% debentures portfolio recommended by investment advisor and commentator Barry Ritholtz in the [Washington Post in December 2014](#).

The portfolio is composed of 8 different types of investments, for each of which we track a matching [ETF](#).

Composition of Initial Portfolio

Asset	Type	Percentage	Equivalent ETF or Index Fund	Symbol
US Stocks	Equity	20%	Vanguard Total Stock Market	VTI
Pacific Stocks	Equity	15%	Vanguard Pacific Stock Index	VPACX
European Stocks	Equity	15%	Vanguard European Stock	VEURX
US Small Caps Value	Equity	5%	Vanguard Small-Cap Value	VBR
US REITs	Equity	5%	Vanguard REIT	VNQ
US Bonds	Debentures	20%	iShares Barclays Aggregate Bond Fund	AGG
US TIPs	Debentures	10%	iShares TIPS Bond	TIP
US High Yield Corporate Bonds	Debentures	10%	Vanguard High Yield Corporate Fund	VWEHX

Expected returns for these securities are calculated by averaging weighted sums of monthly returns for the Study Period, which is a period of ten years beginning 2005 and ending in 2014. The statistical idea underlying these weighted averages is that the expected value of a sum of random variables is the sum of the expectations of the random variables (sic).

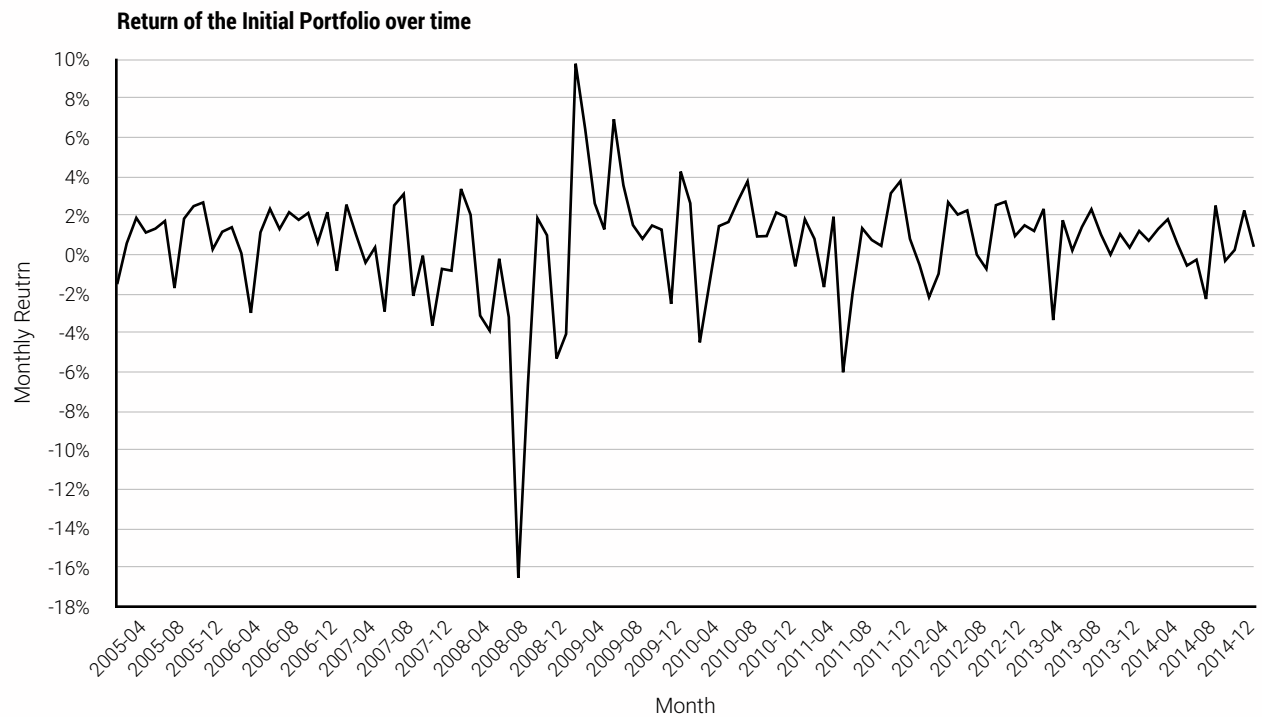
We downloaded the historical performance of those securities on [Yahoo! Finance](#), and used the Adjusted Closing Price factoring splits and dividends, without taking any fees or trading commissions into account (more on this later).

This initial portfolio has an average annual return of 7.00% for this period, and a standard deviation, or volatility of 57.4%.

Return and Volatility of each Asset

Asset	Annual Return	Volatility	Return-to-risk ratio
VTI	0.095427427	0.602906421	0.158279004
VPACX	0.059064428	0.664132637	0.088934687
VEURX	0.065720626	0.809129068	0.081223909
VBR	0.106762855	0.82617905	0.129224839
VNQ	0.121924611	1.056661811	0.115386597
AGG	0.047148207	0.122263593	0.385627522
TIP	0.044843749	0.189159592	0.237068332
VWEHX	0.070571750	0.342446593	0.206081041
Initial Portfolio	0.069988096	0.403880638	0.17328906

Unsurprisingly, graphing the returns over time of the initial portfolio shows important monthly changes and that the worst performance occurred in 2008.



Adding Marketplace Lending

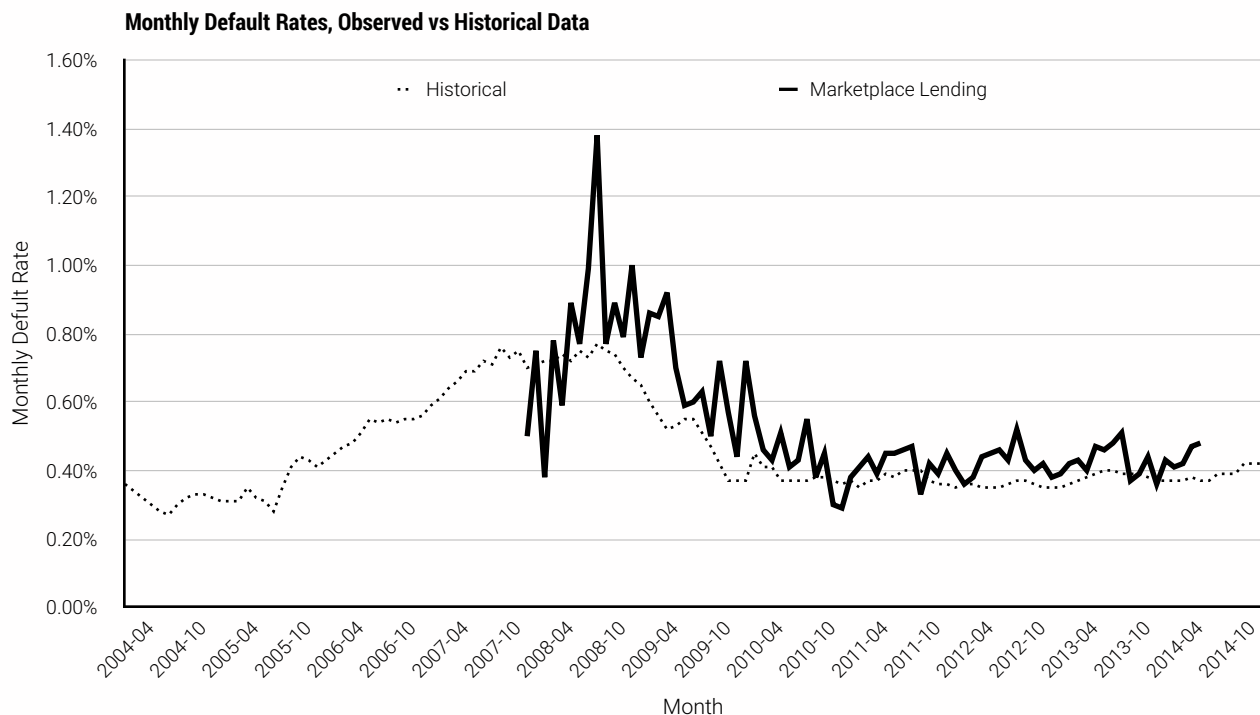
Marketplace Lending is an emerging asset class, which requires several adjustments before analyzing the effects of adding it to the previous portfolio.

In this analysis, we take Lending Club, a consumer credit origination platform, as a proxy of the entire Marketplace Lending asset class. At the time of writing, Lending Club is the largest Marketplace Lending platform with an implied valuation of \$8.5 billion when it did its IPO in December 2014.

Lending Club is transparent about their performances, and publicly discloses when loans were issued, their amount, and how much was paid back directly [on their website](#).

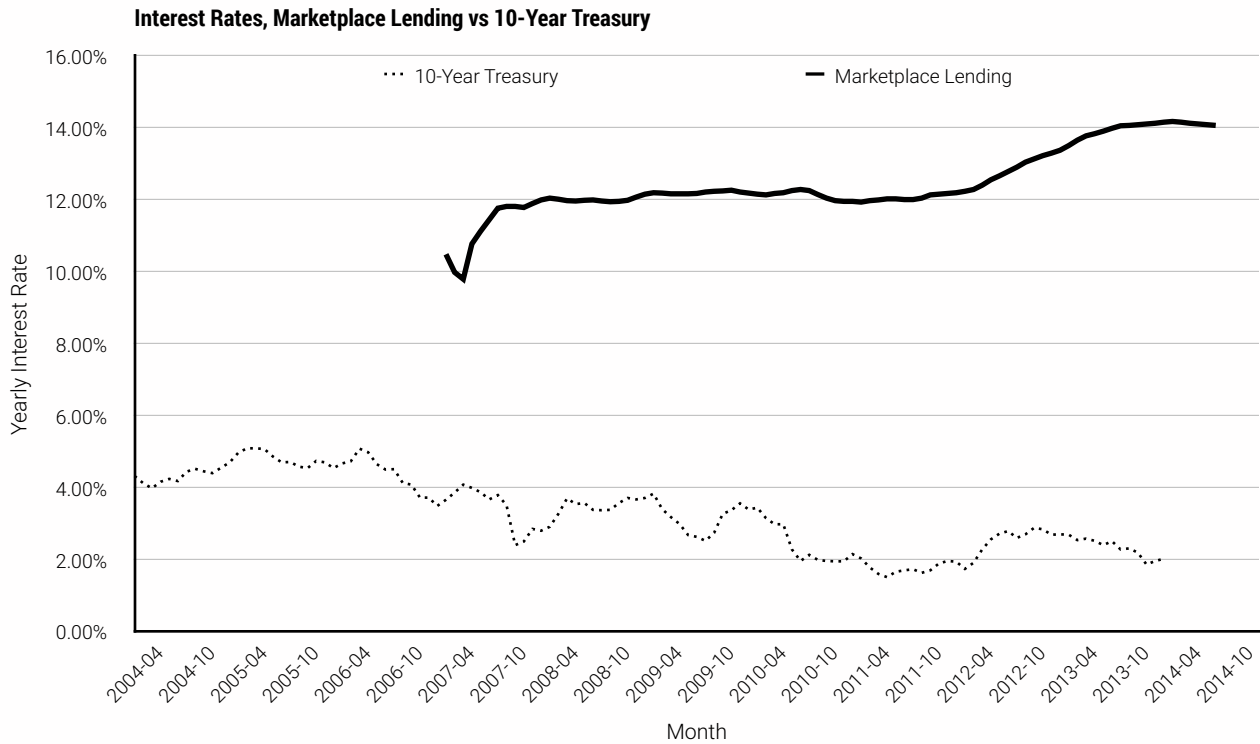
Adding other platforms and other loan categories would probably reduce volatility, but Lending Club was by far the largest loans originator over the study period, and we would rather err on the side of caution by disregarding types of loans that did not reach critical mass over the same timeframe.

Lending Club did not issue loans before June 2007. Therefore we need extrapolate the data to cover the first part of our study period. Returns are based on 2 components: interest rates and probabilities of the payments to be made. One of our prior studies (see [Predicting the Number of Payments](#)) showed that the lifetime distribution function, or probability of the loan to keeps paying over time, is constant over the probability of default. Said otherwise, loans have their highest probability of default at one-third of their maturity, whatever the overall risk. This makes it possible to reduce the forecasting problem to the defaulting rate. To extrapolate that rate, we co-integrate our Marketplace Lending data with historical data available for longer periods. By using a multivariate regression, we can fit [Experian Consumer Credit Default Index](#) to interpolate Marketplace Lending defaults with surprisingly good results.



Such extrapolation aims to preserve the correlation and covariance relationships observed from 2007 to 2014, while moving expected returns for Marketplace Lending assets in step with changes in probable default rates occurring in 2005 and 2006. The R-Square of such co-integration regression is 0.864.

Interest rates are not so well correlated. However, since rates tend to go up in the time before 2007, we can hypothesize that ignoring that trend only penalizes our extrapolation.



Considering the average interest rate for the first semester of activity, projecting it back in time and applying the default rate regression produces expected returns for Marketplace Lending for the first 38 months of the study period.

Another constraint is that most of the loans haven't reached maturity yet. Therefore we cannot simply compare how much was paid with how much was borrowed so far, and need to predict the future payments. To do this, we apply a method developed internally by LendingRobot in 2014 (see [Predicting Returns for Ongoing Loans](#)). Such method allows us to generate expected returns for all the loans issued, either mature or not.

Unsurprisingly, the returns appear significantly more stable than for equities or market-traded debentures. Please note that these returns are net-of-fees, the origination platforms usually charging 1% in service fees.



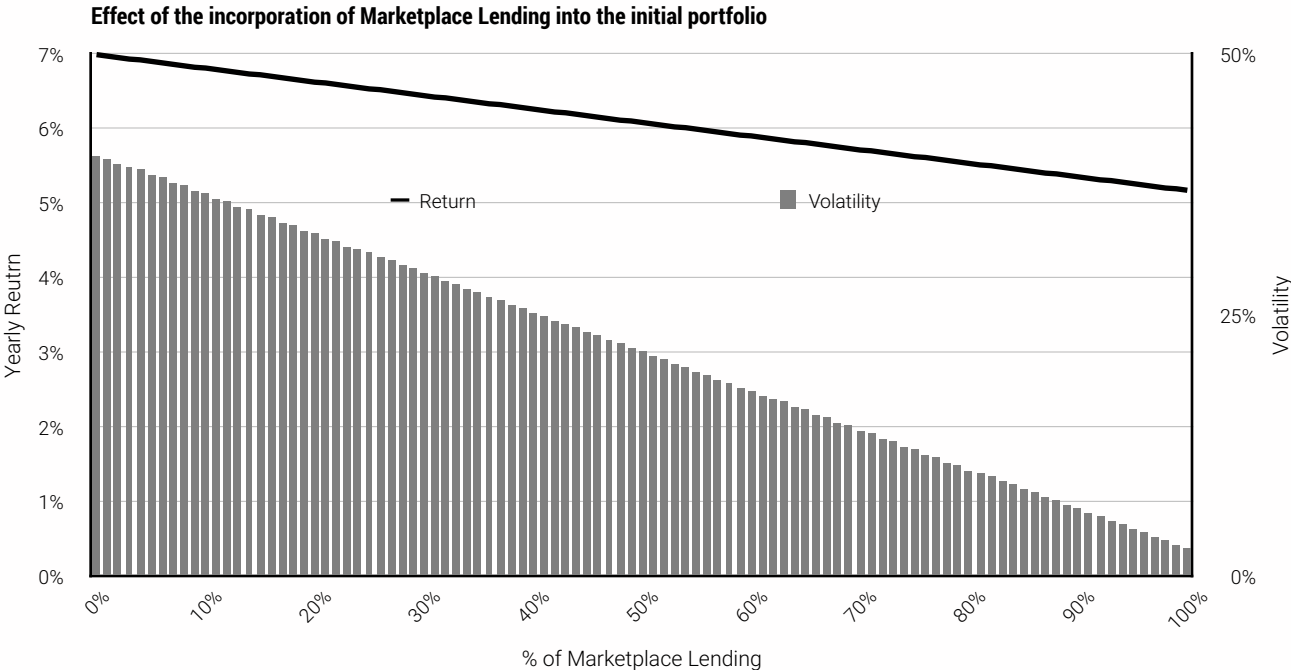
A secondary market is available for Marketplace Lending, but assets fragmentation makes it very slow to trade, at least without an automation tool like LendingRobot, and therefore this secondary market is yet not fully active. We penalize Marketplace Lending returns for that lack of liquidity by deducting fees on Marketplace Lending, but not for the other assets. This is somewhat consistent with the liquidity premium observed over the study period.

Peer Lending vs Initial Portfolio

Asset	Annual Return	Volatility	Return-to-risk ratio
Initial Portfolio	0.069988096	0.403880638	0.17328906
Marketplace Lending	0.051782921	0.027057340	1.91382153

Incorporating Marketplace Lending into the Portfolio

The simplest solution to measure the impact of adding Marketplace Lending as an investment is to start with an arbitrary allocation of 1%, then increase it progressively and compare the performances of the corresponding portfolios. This Marketplace Lending allocation is added to a complementary weighting for the assets of the initial portfolio, i.e., if Marketplace Lending assets have a 1% weight, the initial portfolio has a 99% weight.



Although there is not one 'ideal' spot, one interesting observation is that when adding Marketplace Lending to a portfolio, the volatility decreases faster than the returns.

Building an optimum Portfolio with Marketplace Lending

A more interesting endeavor is to build a portfolio maximizing the return for a given risk.

Usually, investors are compensated for risk (or at least should be); the riskier an investment, the higher its potential return.

But risks can be reduced, at a portfolio level, by diversifying investments.

Diversification lowers risk by combining assets that do not vary at the same time. Calculating the correlation between the various assets in the initial portfolio shows where diversification is the most impactful:

Assets Correlation

	VTI	VPACX	VEURX	VBR	VNQ	AGG	TIP	VWEHX	Mktpl Lending
VTI	1.00	0.85	0.88	0.96	0.82	0.08	0.09	0.75	0.19
VPACX	0.85	1.00	0.88	0.80	0.69	0.14	0.14	0.67	0.13
VEURX	0.88	0.88	1.00	0.82	0.71	0.14	0.15	0.70	0.14
VBR	0.96	0.80	0.82	1.00	0.86	0.07	0.07	0.72	0.13
VNQ	0.82	0.69	0.71	0.86	1.00	0.26	0.28	0.69	0.85
AGG	0.08	0.14	0.14	0.07	0.26	1.00	0.76	0.32	-0.13
TIP	0.09	0.14	0.15	0.07	0.28	0.76	1.00	0.33	-0.02
VWEHX	0.75	0.67	0.70	0.72	0.69	0.32	0.33	1.00	0.01
Mktpl Lending	0.19	0.14	0.14	0.13	0.18	-0.13	-0.02	0.01	1.00

For instance, buying both VTI and VBR is not diversified, because they move together (correlation is 0.96), while VBR and AGG are truly diversified (correlation is 0.07).

Modern Portfolio Theory (MPT) is a method for minimizing the risk of a portfolio for a given level of expected return, by determining an optimum proportion of assets in this portfolio. The underlying assumption is that a collection of assets may have a lower risk than any individual asset itself. MPT aims to reduce the volatility of the portfolio returns by combining assets whose returns are not perfectly positively correlated. It models an asset's returns as normally distributed, defines risk as the standard deviation of returns, and models a portfolio as a weighted combination of assets, so that the return of a portfolio is the weighted combination of the assets' returns.

For every level of return, MPT says there is one portfolio that offers the lowest possible risk, and for every level of risk, there is a portfolio that offers the highest return. These combinations can be plotted on a graph, and the resulting line is called the "efficient frontier".

Calculating those allocations requires the use of non-linear optimization, as [described here](#), for instance.

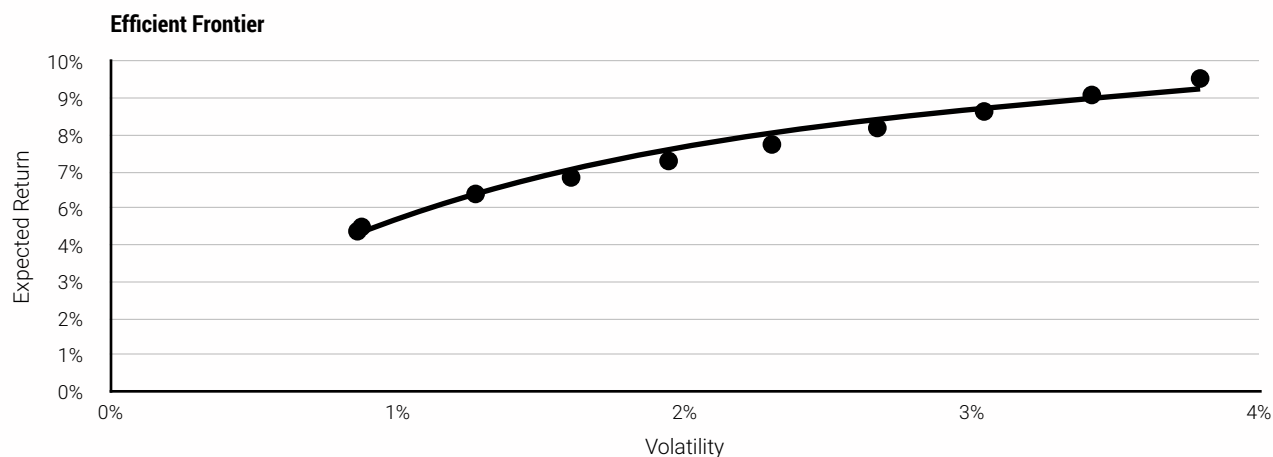
Combining the initial portfolio and Marketplace Lending data, MPT allows us to determine the optimum allocations for various expected returns.

Optimum Portfolios

Performance										
Expected Return	4.87%	5.00%	6.00%	6.50%	7.00%	7.50%	8.00%	8.50%	9.00%	9.50%
Volatility	0.9%	0.9%	1.3%	1.6%	1.9%	2.3%	2.7%	3.0%	3.4%	3.8%
Return / Volatility	5.67	5.72	4.72	4.05	3.60	3.26	3.00	2.79	2.63	2.50
Allocation										
VTI	2%	3%	23%	20%	31%	35%	38%	42%	46%	49%
VPACX	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
VEURX	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
VBR	0%	0%	0%	2%	0%	0%	0%	0%	0%	0%
VNQ	0%	0%	0%	6%	7%	11%	15%	19%	23%	27%
AGG	84%	76%	60%	50%	43%	34%	26%	17%	9%	1%
TIP	0%	2%	0%	0%	0%	0%	0%	0%	0%	0%
VWEHX	0%	2%	4%	10%	7%	8%	10%	11%	13%	14%
Marketplace Lending	14%	16%	13%	12%	12%	11%	10%	10%	9%	9%

According to MPT, the lowest possible volatility gives an expected return of 4.87%. Increasing the target returns means increasing the allocation in VIT, since that is the asset with the higher performance.

Nota Bene: MPT optimization always puts allocation of the assets VPACX and VEURX at 0%. The most likely reason is their strong correlation with higher-performing VT.



Conclusion

Although Marketplace Lending is a new asset, with only limited data so far, a careful extrapolation of the available informant makes it already possible to determine the optimum role it can play in an investor's portfolio.

Due to extreme diversification (investors put tiny amounts in thousands of different notes), the volatility of Marketplace Lending is quite low compared with other assets with comparable returns.

We believe that the present analysis, the first of its kind, has been made rigorously and demonstrates that Marketplace Lending has an important role to play to minimize risks without significantly hurting returns,

Given the current information, we estimate the ideal Marketplace Lending allocation to be between 12% and 14% of a total portfolio.

This analysis will be kept up-to-date and progressively enriched. To see the latest version, please go to LendingRobot.com/HowMuchToInvest

For more information about automating investments in Marketplace Lending, please visit **LendingRobot.com**

