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Securitization based on reverse mortgage in financial markets

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Abstract

This study examines whether returns can be obtained when the securitization process is applied to the reverse mortgage system. To simulate future interest rate forecasts for reverse mortgages in the United States, data for the period 2012-2022 was obtained from "investing.com," Moody's, the Federal Reserve Bank (FED), and the World Bank databases. Using the Matlab software package, various combinations of input variables affecting the asset pool of reverse mortgages were simulated using the Monte Carlo Simulation method. This allowed for the estimation of the minimum and maximum values of future returns, total interest expenses, and total interest amounts to be distributed. The findings of the study suggest that returns are obtained when securitization is applied to the reverse mortgage system. Additionally, the Monte Carlo Simulation method is deemed useful for evaluating the asset pool of reverse mortgages, and it is believed that securitization can significantly contribute to the economy by converting the assets involved in the implementation of reverse mortgages into liquid assets.

Keywords: Reverse Mortgage-Backed Securities, Pool of Assets, Monte Carlo Simulation, Interest Expense

JEL Codes: G1, G17, G21

1. Introduction

Today, financial markets occupy an important place in countries' economic systems. Financial markets collect funds from savers and transfer them at a low cost to those who would make effective use of these funds. The introduction of new financing techniques in developing and ever-deepening financial markets requires an efficiently functioning financial system. In this sense, securitization contributes to the generation of new investment instruments and improves cash circulation in the market by adding liquidity to receivables. Thus, resources are brought back into the economy.

Securitization practices have drawn attention as a new financing method in recent years. Mortgage-backed securitization transactions are considered as one of the important innovations in the financial sector. As a financing instrument, securitization converts asset and security categories into new forms and recombines them. While there are studies on mortgage-backed securitization in the literature, no studies on securitization based on asset pool of reverse mortgage have been found.

Reverse mortgage are a financial instrument used to meet the needs of an ever-ageing population and to mitigate the economic problems of ageing. The revenue from social security institutions is not sufficient to meet the needs of most of elderly people. Financial resource requirements against increasing needs, inadequate retirement opportunities and unexpected circumstances have made the reverse mortgage, a financing system based on real estate mortgage as a new financial instrument, available to older consumers.

Reverse Mortgage is one of the ways to recover the capital in hand. It is, in other words, the process of converting the real estate owned into liquid assets for consumption purposes (Abdioğlu, 2007). This system actually intends to improve the quality of life and income of many pensioners and elderly people with low living standards, who own houses or real estate and also to increase the conversion rate of money, i.e., the multiplier, by increasing the consumption expenditures of these people (Davidoff, Gerhard & Post, 2017: 6)

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The Reverse Mortgage system is a very robust and increasingly widespread sector today. This system began in 1989 by the Housing Authority, an agency of the US Housing and Urban Development Administration, by delivering reverse mortgage insurance through the Home Equity Conversion Mortgage program. There is an increasing demand for this system.

Through securitization, reverse mortgage institutions can make better use of their illiquid assets and make them more liquid by using different investment instruments. Thus, through securitization, institutions can raise funds directly from financial markets and generate new resources for themselves. Securitization, a means of raising funds, contributes to the generation of new investment instruments and improves cash circulation in the market by adding liquidity to receivables. Thus, resources are brought back into the economy. Securitization appears to be an attractive, potential and broad resource of long, efficient funding for mortgage markets in most economies of the world (Yüzbaşıoğlu, 2020).

As a financing instrument, securitization converts asset and security categories into new forms and recombines them. Assets, loans, and receivables of more than one borrower are collected from multiple dealers and sold as asset-backed or other securities. In securitization, a pool of cash flow assets is built up. Several securities are issued based on this pool. In securitization, some risks may appear during and after the transfer of asset pools to funds. Both lender and borrower may be exposed to several risk factors in reverse mortgage. These risks include interest rate risk, loan-to-value ratio (LTV), longevity, etc. for the lender as well as risks such as the risk of the lender's failure to fulfil its obligations and the risk of loss in case the house is sold in the short term for the borrower. Measures such as reverse mortgage insurance, advisory services, securitization, and diversification can be taken to protect against these risks. Reverse mortgage securitization transfers the risk from the lender to the investors. If the reverse mortgage borrower dies early or leaves the property early or the property is appraised, it would lead to a higher return for the reverse mortgage investor (Landis, 2001). The assets in the pool should be diversified and the customers in the pool should be interchangeable in order to minimize the risks that may appear in the pool created according to the mortgage or reverse mortgage. A sufficiently diversified reverse mortgage portfolio would function as risk mitigation. Thus, the asset pool would become more secure. Also, risk can be mitigated by insuring the asset pool.

Institutions with reverse mortgages can liquidate their receivables by converting them into securities so that they make more profit. Securitization can be applicable to many types of receivables. This allows institutions to generate new financial resources for themselves. In this study, calculations were made based on the reverse mortgage asset pool of the securitization, an important instrument and funding tool in the financial system. Monte Carlo Simulation (MCS) method was used for reverse mortgage asset pool calculations and estimates. The minimum and maximum return to be yielded from the asset pool, the total amount of interest and the total amount to be distributed were estimated through MCS, as well. In conclusion, it was found that the MCS method is a useful method in the evaluation of reverse mortgages and securitization based on reverse mortgages would yield returns.

2. Literature

When the literature on mortgage-backed securitization and reverse mortgages is examined, a wide range of academic studies is examined. In these studies, mortgage-backed securitization has generally been applied and no empirical study has been conducted on asset pool calculations for reverse mortgages.

The literature contains various studies on mortgage-backed securitization. The study by Fabozzi (2006) focused on the basic principles and types of securitization and the calculation of the cash flows of the mortgage-backed asset pool. In the study, it was found that securitization was an important financing technique that would continue to grow. Wu and Deng (2010) investigated early repayment of borrowers in Chinese banks with no early repayment penalty and its effects on securitized asset returns. They concluded that early repayment negatively affected the returns on securitized assets and was a risk factor for the securitization process. McConnell and Buser (2011) examined mortgage-backed security (MBS) markets and evaluated the rises and falls in house prices for ten years after 2000 with respect to securitizing MBS markets. As a result of the study findings, it was concluded that the rises or falls in

house prices affected the MBS markets. Castellani (2018) examined the determinants of securitization activities of Italian banks between 2007 and 2014 and the effects of securitization on the credit supply of SMEs. He concluded that securitization had no direct impact on the supply of new SME loans and there was strong evidence that securitization had a stabilizing effect on banks' balance sheets in terms of the risks posed during the 2010-2014 period. In their study, Fuster et al., (2022) investigated the economic effects of MBS risks and asset pricing and mortgage securitization by examining factors such as market size and growth of the mortgage-backed securities market. Based on the findings, they found that the mortgage-backed securities market was expanding and growing day by day.

When the literature is examined, there are very few studies on the securitization process in the studies on the reverse mortgage system. In their study, Heo et al., (2016) examined on Korea's reverse mortgage policies, the main characteristics of beneficiaries, and beneficiaries and non-beneficiaries based on nationwide survey data and concluded that the social security system should be restructured. Nakajima and Telyukova (2017) analyzed reverse mortgage loans granted by banks or financial institutions. As a result of their study, they concluded that the lowest-income and oldest households tripled their demand for reverse mortgage loans and the demand varied according to age, income and wealth distribution. Xiang and Tan (2017) analyzed the reverse mortgage system. Their analysis results showed that people in the reverse mortgage system can get different pensions at different genders and ages and under different payment conditions and the volatility in housing prices had an impact on the determination of reverse mortgage payments. Whait et al., (2019) studied the views of people over the age of 65 who lived in Australia on reverse mortgages. In their study, while some participants refrained from taking out reverse mortgages due to their desire to pass on their property to their children, the others remained undecided on this issue. Their analysis results showed that most people over the age of 65 had a negative view of reverse mortgages. Lorenzo et al., (2020) examined whether or not the risks that the lender assumed in the reverse mortgage were associated with the volatility of the property market (house price risk), financial market risk (interest rate risk) and the uncertainty of the borrower's life expectancy (longevity). They found that such risks affected the determination of the amount to be paid to the persons included in the reverse mortgage system. In their study, Lorenzo, et al. (2022) examined the volatility of interest rates, house prices and mortality rates in the reverse mortgage system as well as the risks and management strategies of reverse mortgage contracts and proposed a securitization process that they considered would avoid any contractual risks by taking out an insurance policy through a special intermediary institution that issued temporary bonds in order to mitigate contractual risks in the reverse mortgage system.

3. Data Set and Method

The aim of this study is to forecast the returns of the securities to be issued based on the asset pool created by the reverse mortgage system by using the MCS method and to give information to the organizations that would issue the securities about the decisions to be taken in their issuances. MCS is an approach of determining the output variable with the random numbers approach in the input variable in solving statistical and experimental problems (Simkins & Simkins, 2013). MCS method is probability calculations for the future. This is a probability calculation method used to estimate possible cases that may be likely to come up in the future by utilizing past and current data (Williams et al., 2008). MCS is used to estimate the probability of different outcomes when there is an intervention of random variables and basically includes assigning multiple values to an uncertain variable to obtain multiple outcomes and then taking the average of the results to obtain a forecast (Ross et al., 2010).

The probabilities that may arise during cash flows should be determined first in order to assess the performance and risk status of the asset pool created based on the reverse mortgage. After determining the maximum and minimum cases of these probabilities, random probabilities should be obtained within this interval. The cash flow of the pool should be calculated for each probability case. After the calculation of the cash flow for each probability state, the worst and best performance state of the pool is determined. MCS is one of the methods used in the appraisal of financial assets. In this method, a large number of interest rate intervals is foreseen. The value of the security is evaluated using these

interest intervals. MCS is frequently used in the appraisal of interest rate-sensitive securities where past interest rate trends are particularly important in the valuation. MCS generates countless randomized market scenarios using predetermined parameters for price volatility and correlation and calculates the profit/loss for each scenario.

MCS method is an interdisciplinary stochastic method and is widely used in decision-making processes. This method involves creating a large number of interest rate ranges by using past and future data and calculating the value of the asset to be securitized by using these interest rate intervals. In particular, past interest rate movements are important in the appraisal process. Accordingly, the MCS forecasts of the interest rates used in the calculation of asset pool based on mortgage loans, sensitive to interest rates, also give information about the possible future interest rates.

The values of the parameters to be utilized in the calculations of the asset pool based on reverse mortgage were established by taking into account that the asset pool is to be calculated in the USA. The data used in the study were based on U.S. housing price indices, reverse mortgage interest rates, Moody's, Federal Reserve Bank (FED), and World Bank statistics for the period from 2012 to 2022. Matlab© package program was used to analyze the data and the simulation codes we developed were run through this package program. A simulation generally involves the evaluation of a model thousands of times. That is to say, a stochastic model was built by considering the distribution of the input variables in the simulation with the values of the variables in the different combinations. In the study the minimum and maximum return of the pool in the interest rate interval forecasted was calculated as a result of 100 million cycles with MCS method. The assumptions of the reverse mortgage asset pool were discussed under 3 headings. These headings include the total revenue of the asset pool, the distribution of interest payable on the security (profit to be distributed), and the allocation of interest expenses paid.

The total amount of assets in the asset pool based on the reverse mortgage was $3.740.000. The age of the customers in the asset pool ranged between 70 and 85. The monthly interest rate varied between 0.5% and 1.5%. The annual rate of increase in the value of housing was between 3% and 6%. Three persons in the asset pool based on the reverse mortgage died after the securitization process. The houses of the deceased persons were sold and monetized. Other liabilities, such as debt incurrence costs and servicing charges, were not taken into account for ease of reference. After the securitization, the security's interest rate to be issued based on the reverse mortgage asset pool was set at 3.5%. Table 1 shows the data used in our study

Table 1. Data of the Asset Pool

Customer	Housing Value ($)	Interest Rate to be charged to the Customer (%)	Interest Rate of Securities to be Issued (%)
A1	250.000	0.5%	3.5%
A2	180.000	0.5%	
A3	210.000	0.5%	
A4	240.000	0.5%	
A5	300.000	1%	
A6	500.000	1.5%	
A7	320.000	1%	
A8	400.000	1%	
A9	350.000	1%	
A10	250.000	0.5%	
A11	380.000	1%	
A12	360.000	1%	
Total	3.740.000		

According to the scenario created based on the reverse mortgage asset pool, both interest expenses and total return of the asset pool will be calculated and MCS analysis will be done. Table 2 shows the interval data used in the MCS analysis.

Table 2. Data of MCS Interest Rate Interval

Customer	Housing Value ($)	Interest Rate	Increase Rate of Housing Value	Interest Rate of Securities to be Issued
A1	250.000	0.5% Min 0.3 Max 0.7	1-3 3% 4-7 2.5% 8-10 3.2%	3.5% Min 3% Max 4%
A2	180.000	0.5% Min 0.3 Max 0.7	1-3 3% 4-8 2.8% 9-10 3.3%	
A3	210.000	0.5% Min 0.3 Max 0.7	1-4 3% 5-7 3.2% 8-10 2.9%	
A4	240.000	0.5% Min 0.3 Max 0.7	1-2 3% 3-7 2.8% 8-10 3.1%	
A5	300.000	1% Min 0.7 Max 1.3	1-3 2.9% 4-7 2.5% 8-10 3.2%	
A6	500.000	1.5% Min 1.2 Max 1.8	1-5 3% 6-8 2.8% 9-10 2.7%	
A7	320.000	1% Min 0.7 Max 1.3	1-3 2.5% 4-7 3% 8-10 3.2%	
A8	400.000	1% Min 0.7 Max 1.3	1-4 3.2% 5-7 2.5% 8-10 3.1%	
A9	350.000	1% Min 0.7 Max 1.3	1-3 3% 4-7 2.9% 8-10 3.2%	
A10	250.000	0.5% Min 0.3 Max 0.7	1-5 3% 6-7 2.8% 9-10 3.2%	
A11	380.000	1% Min 0.7 Max 1.3	1-3 3% 4-7 2.5% 8-10 3.2%	
A12	360.000	1% Min 0.7 Max 1.3	1-4 2.7% 5-8 2.5% 9-10 2.6%	
Total	3.740.000			

4. Findings

How cash flows, changes in interest rates, death of customers, and revaluation in house prices affected the asset pool was determined in the asset pool based on the reverse mortgage. The revenue to be earned after deducting the interest paid to the buyers of the securities upon the issuance of securities based on the asset pool was calculated. The reverse mortgage asset pool consisted of 12 customers and the total value of the houses in the pool was $3.740.000. It was assumed that the age of the customers in the asset pool ranged between 75-85 and all customers in the pool died at the maturity date and their houses were monetized.

The asset pool was calculated using the following formulas (Lacoba et al. 2021). The monthly amount to be paid to the reverse mortgage customer is calculated by the formula below.

$$Annuity = \frac{House\ value}{\frac{1-(1+\ r^{12}\ )^{-85*12-age*12}}{r^{12}}} \quad (1)$$

The annual interest amount is calculated with the r.

The monthly interest amount is calculated by the r^{12}

$$r^{12} = (1 + r)^{(1/12)} - 1 \quad (2)$$

After the calculation of monthly expenses, the total amount to be paid to the customer at the end of the year is calculated by using the following equation.

$$Annual\ income = \text{income}\frac{(1 + r^{12})^{12} - 1}{r^{12}} \quad (3)$$

Interest on the securities issued is paid from the reverse mortgage asset pool. No cash flow was recorded initially in the reverse mortgage asset pool; but then, cash flows in the asset pool began as some of the customers died and the houses were sold and monetized.

The interest was paid for the securities issued based on the reverse mortgage asset pool based on the maturity of the securities issued. The interest payable on the security was expressed under interest to be distributed. The calculation of such interest payments is based on the formula below.

$$Monthly\ Interest\ Payment\ to\ be\ Distributed_1 = \frac{Interest\ Rate}{12} x\ \text{Capital} \quad (4)$$

Developments in the markets in the future are not possible to be foreseen in advance. Therefore, scenarios were produced by using MCS method under several assumptions for the situations that the asset pool may come across. The data collected from various scenarios based on the asset pool indicated that the cash flows of the asset pool were positively affected by the interest rate changes in the markets. Table 3 shows the calculations related to the reserve mortgage asset pool.

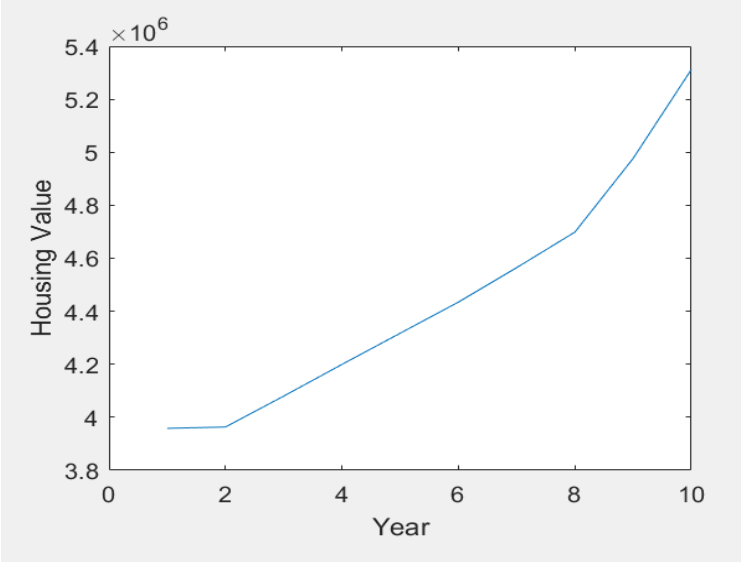
Table 3. Securitization Pool of Reserve Mortgage

Month	(1) Initial Balance	(2) Capital Payments	(3) Monthly Interest	(4) Indebtedness Amount	(5) Dist. Interest	(6) Housing Value	(7) Remaining Housing Value after Deducting Debts
1	3740000	21150		21150	10908	3958250	3937100
2	3718850	21150	188	21338	10847	3958250	3936912
3	3697700	21150	378	21528	10785	3958250	3936722
4	3676550	21150	570	21720	10723	3958250	3936530
5	3655400	21150	763	21913	10662	3958250	3936337
6	3634250	21150	959	22109	10600	3958250	3936141
7	3613100	21150	1157	22307	10538	3958250	3935943
8	3591950	21150	1356	22506	10477	3958250	3935744
9	3570800	21150	1558	22708	10415	3958250	3935542
10	3549650	21150	1762	22912	10353	3958250	3935338
11	3528500	21150	1967	23117	10291	3958250	3935133
12	3507350	21150	2175	23325	10230	3958250	3934925
13	3486200	21150	2385	23535	10168	3963288	3939753
...	...	...	...	...	...	...	...
65	2398250	19650	17075	36725	6995	4434578	4397852
66	2378600	19650	17434	37084	6938	4434578	4397494
67	2358950	19650	17797	37447	6880	4434578	4397131
68	2339300	19650	18163	37813	6823	4434578	4396765
69	2319650	19650	18534	38184	6766	4434578	4396394
...	...	...	...	...	...	...	...
76	2189900	18350	21203	39553	6387	4564571	4525018
77	2171550	18350	21600	39950	6334	4564571	4524621
78	2153200	18350	22002	40352	6280	4564571	4524219
79	2134850	18350	22408	40758	6227	4564571	4523813

80	2116500	18350	22818	41168	6173	4564571	4523403
81	2098150	18350	23233	41583	6120	4564571	4522988
82	2079800	18350	23653	42003	6066	4564571	4522568
83	2061450	18350	24077	42427	6013	4564571	4522144
84	2043100	18350	24506	42856	5959	4698593	4655737
.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.
109	1584350	18350	36927	55277	4621	995841	940564
110	1566000	18350	37499	55849	4568	995841	939991
111	1547650	18350	38078	56428	4514	995841	939413
112	1529300	18350	38664	57014	4460	995841	938827
113	1510950	18350	39256	57606	4407	995841	938235
114	1492600	18350	39854	58204	4353	995841	937636
115	1474250	18350	40460	58810	4300	995841	937031
116	1455900	18350	41072	59422	4246	995841	936419
117	1437550	18350	41692	60042	4193	995841	935799
118	1419200	18350	42318	60668	4139	995841	935173
119	1400850	18350	42951	61301	4086	995841	934540
120	1382500	18350	43592	61942	4032	995841	933899
TOTAL	305.153.000	2.375.850	2.114.086	4.489.936	890.030	439.890.972	435.401.036

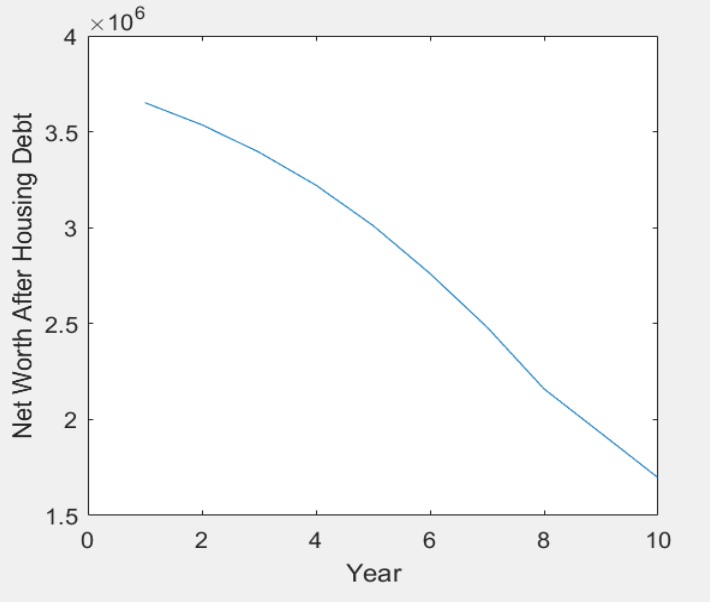
The return of the asset pool (return generated) in Table 3 was calculated as USD 3.079.900. The amount (interest + capital) paid to the customers by the organizations that carry out the reserve mortgage transaction was referred to as debt. The payments of the interest rates charged on the houses in the asset pool are set again at the beginning of each year and payments were made to the house owners by charging this interest rate for 12 months. The total monthly interest payment was calculated as 2.114.086 USD and the total interest expense to be distributed was calculated as 890.030 USD. The cash flows derived from the asset pool were used to make payments for the securities issued. After monthly (periodic) payment amounts have been collected and expenses have been deducted, they were transferred to the investors who bought securities.

The new value of the housing in the reserve mortgage-based asset security pool is calculated by adjusting the revaluation rate in January each year. The monthly payments to be made to the customers based on the new value of the housing are calculated according to the interest rate set again and the amount to be paid to the customers for 12 months is calculated again. Interest rates charged on payments are set based on market conditions and agreements with customers. Graph 1 shows the value increase of housing in the asset pool.



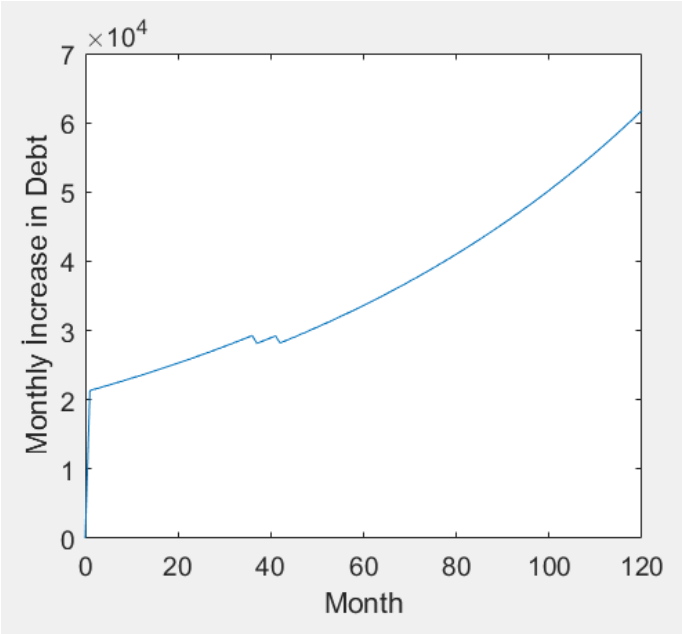
Graph 1. Housing Value Rise

Graph 2 shows the housing value change generated by utilizing the data in Table 1.



Graph 2. Housing Value Change

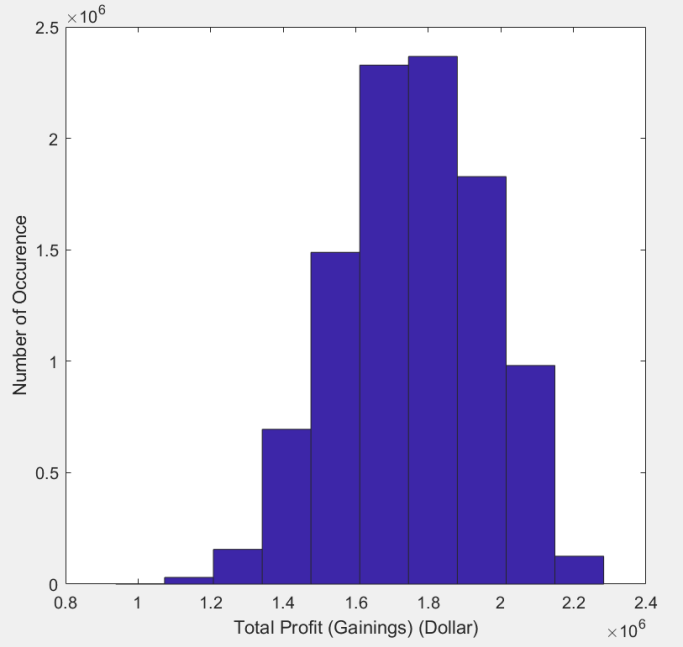
In reverse mortgage, in contrast to a conventional mortgage, the total outstanding debt cumulatively increases over time at compound interest. Even if payments are interrupted, the maturity continues and becomes payable only when the borrower no longer resides in the housing. During this process, the debt balance continues to increase along with the interest burden (Boehm & Ehrhardt, 1994). Graph 3 shows the increase in asset pool debt.



Graph 3. Monthly Increase in Total Debt Tracking

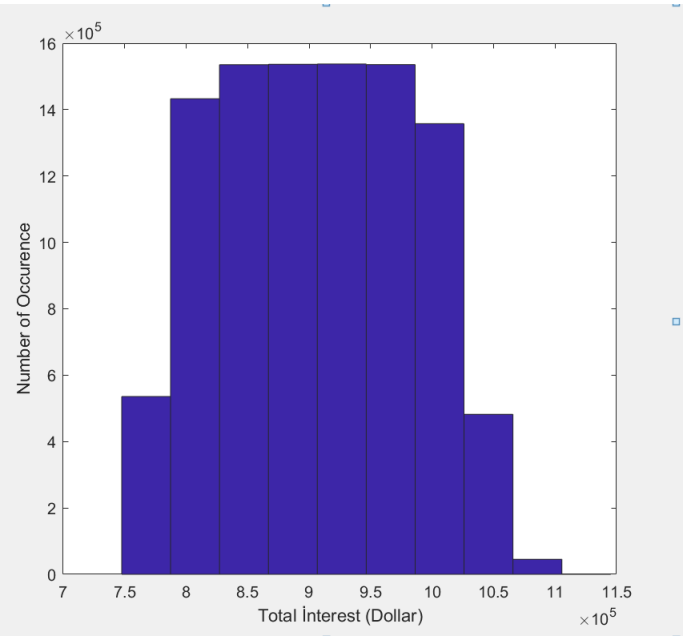
The MCS method is a system based on probability theory. MCS is the use of statistical and mathematical techniques to simulate and analyze an experiment or event by repeatedly using random numbers. The asset pool in the study was analyzed using MCS. The MCS predictions were made using the data in Table 2.

The expected return of an investment is the expected value of the probability distribution of possible returns to investors. The return of investment is an unknown variable with different values associated with different probabilities. The expected return is calculated by multiplying the potential outcomes (returns) by the chance of each outcome occurring and then calculating the sum of these outcomes. Graph 4 shows the return of the reverse mortgage asset pool after the securitization process.



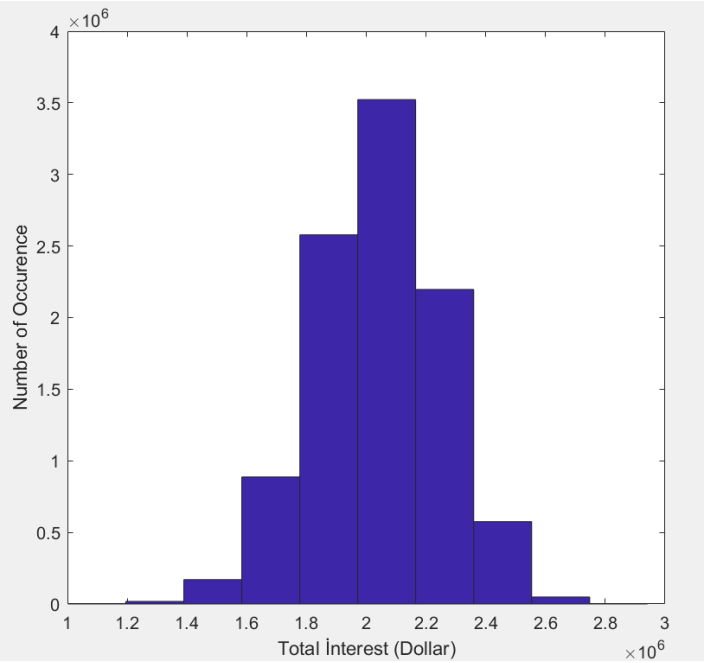
Graph 4. Total Profit (Gaining)

In Graph 4, the minimum return of the revenue (return) distribution of the asset pool based on reserve mortgages was $938.583, with a probability of 0.1%. The maximum total return of the pool was estimated as 2,283,327 dollars with a probability of 3% and the average return was estimated as 1.758.858 dollars. The total return of the asset is expected to be in the range of 1.1^6 - 2.2^6 dollars with a probability of 24% as a result of the simulation.



Graph 5. Total Interest Distribution

The interest to be paid for the securities to be issued based on the reverse mortgage is referred to as distributable interest. In Chart 5, the minimum return of the total interest distribution for the securities to be sold in secondary markets after being converted into securities to be issued based on the reverse mortgage asset pool was 747.557 USD with a probability of 5%. The maximum distributable interest of the pool was estimated as 1.136.604 USD with a probability of 15% and the average distributable interest was estimated as 905.959 USD. The simulation result showed that the interest amount to be distributed to the asset pool in Graph 5 was expected to be between 7.5^6 - 11^6 USD with a probability of 15.5%.



Graph 6. Interest Expenses

The interest expenses the asset pool were added to the monthly capital payments to customers. In Graph 6, the minimum total interest cost for the total interest expense distribution of the reserve mortgage asset pool was 1.001.035 USD with a probability of 3%. The maximum total interest cost of the pool was estimated as 2.941.758 USD with a probability of 4% and the average interest cost was estimated as 2.040.436 USD. The simulation result showed that the total interest cost of the asset pool in Figure 6 was expected to be between 1.2^6 - 2.8^6 USD with a probability of 36%.

5. Conclusion

This study analyzed the cash flows of asset pool created by reserve mortgage institutions while converting their illiquid assets into securities through securitization, an alternative financing source. The minimum and maximum values of the asset pool, which hold an important place in securitization, were estimated by using the MCS Method for analyzing the interest costs, interest to be distributed and return to be obtained analyses. These calculations help to appraise the securitized assets at real value when the securities have been issued using the collected data.

According to the findings of this study, institutions implementing securities through the reverse mortgage system can obtain returns by securitizing illiquid assets. Analysis of the asset pool's interest expenses, interest distributed and returns earned was evaluated using the MCS Method. According to the analysis results obtained from Monte Carlo simulation outputs, the expected returns and distributed interests of the reserve mortgage-backed asset pool were determined. Findings from the study show that the expected return of the asset pool is 938,583 USD with a minimum probability of 0.1%, 2,283,327 USD with a maximum probability of 3%, and an average of 1,758,858 USD. The interest distributed is estimated to be $747,557 with a minimum probability of 5%, 1,136,604 USD with a maximum

probability of 15%, and 905,959 USD on average. It is predicted that the total interest expense will be 1,001,035 USD with a probability of at least 3%, 2,941,758 USD with a probability of at most 4%, and an average of 2,040,436 USD. Monte Carlo simulation serves as an important tool for predicting future returns and interest expenses. Analyzes based on these simulation outputs will provide an important resource for assessing the potential performance of reserve mortgage-backed asset pools and forecasting future financial conditions.

The study results provide consistent information in advance about possible asset pool returns in the future, total interest costs and the total amount of interest to be distributed. It was also concluded that institutions that impose reverse mortgages can generate returns by converting their non-cash assets into cash through securitization. The simulation results were compared with analytical calculations and the reliability ranges of the simulation results were obtained for each case. When all cases are considered at the same time, the deviation value of the method from analytical calculations was found to be between 2-24% at most. These deviation values fall within acceptable limits in the future decision-making processes and risk analyses of the organization.

Organizations intending to engage in securitization through the reserve mortgage system should identify potential risks during the management of asset pools and develop effective risk management strategies. Additionally, it is crucial to continuously update and improve financial models. Strengthening customer communication and closely monitoring regulations are also important measures. These recommendations will assist organizations in managing reserve mortgage transactions more effectively and better preparing for future uncertainties.

When the future is predicted, it is no longer unknown and the uncertainty disappears. Risks turn into opportunities when the predictions are correct. This case increases the gains to be obtained. The method we have used allows us to realistically estimate the profit/loss to be obtained from the asset pool in case the scenario takes place. It is even a profit if the loss can be estimated in advance. The estimation of profit/loss in advance is a significant factor that favors making an investment decision. As participation in this system expands, consumption expenditures would rise and thus the money multiplier would increase. As the money multiplier increases, an increment in macroeconomic indicators would be noticeable and significant contributions to economic growth would be observed. Consequently, it is considered that converting the assets into liquid form involved in the implementation of reverse mortgages by means of the securitization process would make significant contributions to the economy.

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ETİK VE BİLİMSEL İLKELER SORUMLULUK BEYANI

Bu çalışmanın tüm hazırlanm süreçlerinde etik kurallara ve bilimsel aıf gösterme ilkelerine riayet edildiğini yazar beyan eder. Bu çalışma etik kurul izni gerektiren çalışma grubunda yer almamaktadır.

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1. yazar katkı oranı: % 100