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RELATIONSHIP BETWEEN SECURITISATION AND RESIDENTIAL MORTGAGE MARKET YIELDS IN MALAYSIA: A COINTEGRATION APPROACH

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ABSTRACT

This article examines the possible long-run association between residential mortgage securitisation and yield spread for residential mortgage rates in the Malaysian primary markets. The cointegration and error-correction framework was applied to quarterly data from the third quarter of 1988 to the first quarter of 2003. Unit root tests revealed that each variable is non-stationary in levels at the 5 percent level of significance. The cointegration test shows a cointegration between these variables. The estimate of error-correction model shows a high adjustment speed for yield spread to the deviation in the long-run equilibrium. Meanwhile, securitisation responded very slowly to the deviation.

Keywords*: Securitisation; mortgage backed securities; yield spread, bond market; capital market; residential market.*

ABSTRAK

Artikel ini melihat hubungan jangka panjang yang mungkin wujud di antara pinjaman perumahan yang disekuritikan dengan beza pulangan kadar pinjaman perumahan dalam pasaran primer di Malaysia. Kaedah ko-integrasi dan 'error-correction model' diapplikasikan bagi melihat hubungan ini. Analisis adalah meliputi data suku tahunan daripada suku ketiga tahun 1988 ke suku pertama tahun 2003. Ujian punca unit menunjukkan setiap angkubah adalah tidak pegun dalam bentuk tingkat pada aras keertian 5 peratus. Ujian ko-integrasi menunjukkan wujudnya ko-integrasi antara angkubah-angkubah. Anggaran 'error correction model' menunjukkan beza pulangan bertindak pantas mengubah suai daripada penyimpangan dari keseimbangan jangka

panjang manakala pinjaman perumahan yang disekuritikan mengubah-suai amat perlahan dari penyimpangan dari keseimbangan.

***Kata kunci**: Securitization; pinjaman perumahan yang disekuritikan; beza pulangan; pasaran bon; pasaran modal; pasaran perumahan.*

INTRODUCTION

The importance of fixed-income securities markets in promoting economic development in the Asian and Pacific region is greatly recognised. These markets are expected to reduce the dependence of private institutions on banks, the equity market and external resources. However, the region's bond markets have yet to be fully developed to convert household savings into long-term investments effectively.

Recognising the limited supply of tradable debt instruments in primary markets and the severe liquidity problem experienced by secondary markets in the region, each respective government has created mortgage-backed securities in their countries. Mortgage backed-securities are critically important in developing and deepening fixed income securities markets because they represent a viable alternative to traditional corporate bond instruments to the investors, provide alternative sources of funds to companies, provide liquidity to financial institutions and causes lower cost of borrowing to borrowers. Experience shows that during the recent Asian financial crisis, financial institutions in the region were in financial distress as their capital adequacy and liquidity ratio deteriorated.

Around the world, asset-backed securities markets have been growing rapidly. The US asset-backed securities market is the largest. More than $1.6 trillion in mortgage-backed securities are currently outstanding in the United States. Asset backed-issues have been consummated in UK, France, Germany, Spain, Italy, Belgium, Netherlands and Sweden, among other countries since 1987. Many countries in Asia, including Malaysia, Japan, Hong Kong, Thailand, Indonesia, India and Philippines have all seen the introduction of asset-backed securities, as have Canada, Australia, New Zealand, and a number of countries in Latin America. In addition, new asset-backed bonds are issued in the Eurobond market almost daily. The instrument has become a standard component of yield seeking international investment portfolios.

There are perhaps three main reasons why asset backed securities have been growing so fast and it will probably continue to do so. These

relate to the industry's main constituents, which are the:
- underlying borrowers (companies or consumers);
- originators or asset sellers (financial institutions, companies); and
- investors (institutional investors).

Financial institutions gain from securitisation by obtaining many of the benefits of high-credit-quality financing without retaining the debt on their books and without foregoing profitable aspects of the assets. Specifically, these advantages include the following: removal of asset from the balance sheet; retention of servicing revenues as its continues as a servicer; lower financing cost than if it could issue security by itself; reduction in regulatory capital requirement; retention of competitive advantage as securitisation allows for a reduction in assets; and improved asset-liability management.

Hence, financial institutions, by holding a mortgage-backed security rather than the mortgage itself, would achieve greater liquidity. The question raised here is either the increase in liquidity for financial institutions would translate to the lower residential mortgage loan rates received by borrowers.

Since the introduction, we believe that securitisation of the residential mortgage market has significantly transformed the financial institution liquidity in Malaysia. Therefore, this paper will examine the effects of securitisation on yield spreads in the primary residential mortgage market in Malaysia. In other words, the paper tries to answer a question whether the securitisation that benefits financial institutions gets passed on to borrowers. The cointegration technique was employed to test the relationship between the increasing volume of mortgage securitised over time and the yield spread on residential mortgage loan rates. The remainder of the paper is organised as follows: firstly, the development in residential mortgage backed securities in Malaysia, followed by a review of literature, empirical methodology, empirical results and finally, conclusion and remarks.

THE RESIDENTIAL MORTGAGE BACKED SECURITIES DEVELOPMENT

Until the early 1980s, the debt securities market was practically nonexistent in Malaysia. The market comprised only Malaysian Government Securities (MGS), where the market was largely a captive market. Provident funds, financial institutions and insurance funds in Malaysia were required to invest a prescribed part of their funds in

MGS. As these investing institutions tended to hold the MGS to maturity, there was effectively no secondary market. Recognising the importance of having a secondary market, the government took measures to liberate the MGS market and to add depth to the market. At the same time, the government also decided to take positive action to develop the debt securities market as a whole.

In relation to this, the central bank, Bank Negara Malaysia, recommended the establishment of a secondary mortgage market to develop the private debt securities market. One committee was set up in 1986 to push for the creation of a national mortgage corporation to act as an intermediary between primary lenders and investors in long-term funds and to issue secondary mortgage securities. In December 1986, a national mortgage corporation, Cagamas Berhad was thus incorporated. The mortgage securities were first issued in 1987.

Besides the need of a private debt market, the financial institution liquidity problems have also stimulated the introduction of mortgage-backed securities. Financial institution liquidity in the early 1980s had become increasingly tight, reflecting mainly the excess demand for credit relative to deposit growth. The loans-to-deposit ratio of the banking system had deteriorated to 98% by the end of September 1986, from 89% at the end of 1980. This had caused a pressure on financial institution liquidity. With the introduction of securitisation through the creation of Cagamas, it was hoped that liquidity in the market would increase.

Cagamas bonds are medium term obligations of Cagamas Berhad. The typical maturity of the bonds is three, five and seven years. It has a fixed or floating coupon rate. All Cagamas bonds have been rated AAA by the two Malaysia credit rating agencies. Similar to MGS, Cagamas bonds have a largely captive market. Commercial banks, merchant banks, and finance companies hold the bulk of Cagamas bonds to satisfy liquidity requirements. Other significant holders include pension provident funds and insurance companies.

Cagamas bonds have grown tremendously over the years. As shown in Table 1, fixed rate Cagamas bond issues had increased from RM1,800 million at the end of 1988 to RM9,312 million at the end of 1995 and to RM25,628 million at the end of 2003; MGS issues, on the other hand, had not grown as rapidly in the 1990s.

Cagamas bonds were the most common private debt securities (PDS) issued until 1993, up to which time the PDS market was relatively inactive. It comprised the biggest share of PDS ranging from 37.08% to

66.01% for the period. The success of Cagamas bonds has encouraged several large corporations with good credit standing to raise funds by issuing floating or fixed rate term notes. Total PDS rose tremendously from RM16,021 million in 1993 to RM161,630 million in 2003, where Cagamas bonds share of PDS depleted from year to year to 15.86% in 2003.

Table 1
Fixed-rate Debt Instruments Outstanding, 1987-2003
(Nominal Value in RM Million)

	MGS		Cagamas bonds		
Year	**Value**	**% increase**	**Value**	**% increase**	**Total**
1988	55831	-	1800	-	57631
1989	58213	4.3	2500	38.9	60713
1990	62106	6.7	2900	16.0	65006
1991	65263	5.1	2900	0.0	68163
1992	66643	2.1	5137	0.0	69543
1993	66018	-0.9	5940	72.9	68998
1994	64969	-1.6	8925	78	71829
1995	64719	-0.4	9312	4.3	74031
1996	66910	3.4	13227	42.0	80137
1997	66262	-1.0	16756	26.7	83018
1998	75012	13.2	15064	-10.1	90076
1999	78336	4.4	13019	-13.6	91355
2000	89050	13.7	17312	33.0	106362
2001	103450	16.2	18427	6.4	121877
2002	109550	5.9	22595	22.6	132145
2003	130800	19.4	25628	13.4	156428

Source: Bank Negara Malaysia Annual Reports.
Data from 1987 to 1992 is from The World Bank, June 1995,The Emerging Asia Bond Market.

Table 2
Private Debt Securities: Amount Outstanding (RM Million).

	Cagamas bonds		Other PDS *		Total PDS
Year	**value**	**% total PDS**	**value**	**% total PDS**	
1988	1800	66.01	927	33.99	2727
1989	2500	60.55	1629	39.45	4129
1990	2900	49.32	2980	50.68	5880
1991	2900	39.17	4503	60.83	7403

(continued Table 2)

	Cagamas bonds		Other PDS *		Total PDS
Year	value	% total PDS	value	% total PDS	
1992	5137	44.39	6436	55.61	11573
1993	5940	37.08	10081	62.92	16021
1994	8925	37.10	15131	62.90	24056
1995	9312	29.09	22701	70.91	32013
1996	13227	28.29	33528	71.71	46755
1997	16756	26.45	46594	73.55	63350
1998	15064	24.38	46737	75.62	61801
1999	13019	14.20	78632	85.80	91651
2000	17312	14.70	100494	85.30	117806
2001	18427	13.54	117674	86.46	136101
2002	22595	17.86	103951	82.14	126546
2003	25628	15.86	136002	84.14	161630

* Exclude short term commercial paper, Danaharta, Danamodal bonds.
Source: Bank Negara Malaysia Annual Reports

Development in the mortgage securitisation that was related to the financial institutions could also be seen from the increasing value of residential loans that has been securitised. Table 3 shows the change in the size of residential loans that has been securitised since 1987. As at the fourth quarter of 2002, the residential loans sold to Cagamas by financial institutions stood at RM13,640 million, as compared to RM0.283 million in the fourth quarter of 1987. The share of residential loans to Cagamas of total residential loans accounted for more than 15% since 1992 and achieved the highest of 30% in the fourth quarter of 1997.

Table 3
Financial Institutions: Total Housing Loans and Loans to Cagamas
(At the fourth quarter of the year)

	Loan to Cgms (RM Million)	Total Residential Loans (RM Million)	% Cgms Loans of Total Residential Loans
1987	283.3	10119.3	2.80
1988	570.53	10620.93	5.37
1989	1412.67	12226.27	11.55
1990	1845.57	14798.47	12.47
1991	1841.07	17717.87	10.39
1992	3784.27	20949.57	18.06

(continued Table 2)

	Loan to Cgms (RM Million)	Total Residential Loans (RM Million)	% Cgms Loans of Total Residential Loans
1993	3789.53	24337.63	15.57
1994	7064.9	27692.2	25.51
1995	8978.3	33041.9	27.17
1996	13623.9	49399.3	27.58
1997	19327.9	64419.2	30.00
1998	19098.1	69808.3	27.36
1999	15701.8	72104.5	21.78
2000	15293.7	63601.5	24.05
2001	13768.5	72896.53	18.89
2002	13640.3	82847.51	16.46

Source: Bank Negara Malaysia Annual Reports

REVIEW OF SELECTED LITERATURE

Several studies ascribe market benefits of securitisation. Jones (1962) pointed to improved liquidity as a key effect. Black, Garbade and Silber (1981) and Passmore and Sparks (1996) argued that the implicit government guarantee enhances quality. Greenbaum and Thakor (1987) demonstrated that banks, by selling loans rather than funding them through deposit, could can provide a useful signal of loan quality. According to Hess and Smith (1988) asset securitisation is a means of reducing risk through diversification. Boot and Thakor (1993) affirmed that this diversification may improve information. When assets are assembled in portfolios, they yield payoff patterns that are easier to evaluate. Donahoo and Shaffer (1991) and Pennachi (1988) demonstrated that banks securitised assets in order to lower reserve and capital requirements and thereby reduce financing costs.

Few researchers look specifically at the benefits of securitisation on mortgage market yields. Kolari, Fraser and Anari (1998) interpreted that greater securitisation causes a decline in mortgage rates. A 10% increase in the proportion of mortgage securitised decreases yield spreads on home loans by approximately 16 basis points. Black *et al*. (1981) found that a US$10 billion increase in outstanding Government National Mortgage Association (GNMA) in the period 1971-1978 was associated with a decrease in the GNMA-Treasury yield spread of 0.0192 times the Treasury yield, which they translated into a reduction of about 16 basis points on Federal Housing Administration (FHA)

home loans. Other studies by Northaft, Gabriel and Rothberg (1989), Chloewicki (1985) and Jameson, Dewan and Sirmans (1992) reported significant decreases in yield spreads due to the introduction of Collateralised Mortgage Obligations (CMO).

There are also several potential drawbacks to asset securitisation. Pennachi (1988) stressed moral hazards, which arise because the bank has less incentive to monitor and service loans after they are sold. Mustafa and Rahman (1996) showed an absence of long-run relationship and long-run Granger causality between mortgage and capital market. This implied that both markets may still be segmented despite the securitisation. Heuson, Passmore and Sparks (2000) suggested that mortgage securitisation does not necessarily lower the equilibrium mortgage rate. Securitisation does alter the placement of mortgages between the originator and the securitiser, but it may leave the cost of holding the marginal mortgage unchanged. They predicted that a decline in mortgage rates causes the volume of securitisation to rise. Special comment from Moody's Investor service in Moody's Perspective 1987-2002 highlighted that securitisation does not necessarily provide access to low-cost funding and transfer risk.

Relevant to this study, more recent empirical studies in this area by Kolari *et al*. (1998), Goebel and Ma (1993) and Devaney, Pickerill and Krause (1992) used Engle and Granger's (1987) econometric method of cointegration analysis. They argued that cointegration analysis is a more appropriate empirical approach due to non-stationary in interest rates. Cointegration analysis could also be used to generate impulse response functions and variance decompositions that are useful in understanding the time path of the impact of securitisation on yield spread.

Mortgage yield spreads are hypothesised to have a long-term relationship to securitisation. Further investigational into this relationship was performed by incorporating prepayment risk measure in a multivariate framework.

METHODOLOGY

Data were obtained from various agencies including Bank Negara Malaysia, Maybank Berhad, Cagamas Berhad and Rating Agency Malaysia Berhad. The data were gathered on a quarterly basis from the third quarter of 1988 to the first quarter of 2003. Thus, the present analysis encompasses data from the late 1980s to early 2000s, a period of time in which securitisation became the dominant form of mortgage

market finance, interest rates became free to be determined by market forces and the bond market underwent development through major reforms by government.

Following Kolari *et al*. (1998), the relationship between mortgage yield spreads and mortgage securitisations within multivariate frameworks was examined. The model expresses the mortgage yield spread as a function of variables measuring prepayment risk and marketibility risk. However, this paper excluded credit risk as a measure by foreclosure rate due to the unavailability of data (commercial bank classifies the foreclosure rate as confidential). Kolari *et al.* (1998) found that credit risk is not an important variable that affected mortgage yield spread.

The multivariate models enable an estimate of the long-run relationship for yield spread (YSP), Securisation (SEC) and prepayment risk (PRS). The variables YSP, SEC, and PRS are expressed as percentage rates.

$$YSP_t = a_0 + a_1 SEC_t + a_2 PRS_t + e_t \quad (1)$$

Dependent variable (YSP_t) is defined as the average of the monthly differences between the effective rate on housing loans and the MGS yield for 20 years. The housing loan rate is collected directly from the primary market, that is, from Maybank Bhd., the biggest bank in Malaysia. The loan rate is a flexible loan rate on long-term housing loans between 20 to 25 years maturity. MGS maturity of 20 years is used as it is close to the average maturity on all housing loans closed for the month. In addition, MGS of 20 years is among the active long-term bonds traded in Malaysia. It is to represent the risk free rates in the market.

Following approach of Kolari *et al*. (1998) and Black *et al*. (1981), the dependent variable is related to variables designed to capture major determinants of yield spreads on housing loans, including marketability, and prepayment risk.

Marketability risk is the main focus of this paper and it is proxied by the level of housing mortgage securitisation. SEC is calculated by total housing loan in the market that has been securitised divided by total housing loans in the market. This is the percentage of housing loans securitisation in the market.

Prepayment risk is proxied by the spread between 10-year and 1-year government securities (PRS). Prepayment risk is strongly recommended by an anonymous referee as it is closely related to the level of interest rate, such as Kolari *et al*. (1998), Devaney *et al*. (1992),

and Heuson *et al*. (2000). Low levels of interest rates would prompt refinancing and thereby prepayments by homeowners, and vice versa when interest rates are relatively high. PRS captures the shape of the yield curve, which changes over the interest rate cycle. Yield spreads decrease as the level of interest rates rise and prepayment risk diminishes. Theoretically, PRS is positively associated with YSP.

Yule (1962), Granger and Newbold (1974), and Phillips (1986) had shown that the ordinary regression of two non-stationary variables may produce spurious regression results. Therefore, it is necessary to test for stationarity of the variables before estimating the models. To test for the non-stationarity in each variable, the following equations are considered for a unit root in each variable both with and without a trend (T).

$$DYSP_t = r_0 + rT + r_1 YSP_{t-1} + w_t \quad (2)$$

$$DSEC_t = p_0 + pT + p_1 SEC_{t-1} + e_t \quad (3)$$

$$DPRS_t = s_0 + sT + s_1 PRS_{t-1} + x_t \quad (4)$$

where w_t e_t and x_t are random disturbance terms and D is the first difference operator.

The null hypothesis is that $|r_1| = 1$, $r\ |p_1| = 1$, or $|s_1| = 1$ against the respective alternative hypothesis that $|r_1| < 1$, $r\ |p_1| < 1$, or $|s_1| < 1$.

If the null hypothesis of a unit root cannot be rejected in each equation, then every individual time series is non-stationary in levels. But stationarity can be induced in every series by the first or higher order differencing of the level data. To test for unit root the Augmented Dickey-Fuller (ADF) test was applied. To be cointegrated, YSP, SEC, and PRS must have the same order of integration (Engle & Granger, 1987).

To test for cointegration, the Johansen cointegration was used, where firstly, the order of integration of each variable was tested using the ADF test. Then, the model was estimated and the number of cointegrationg vectors using $\lambda_{trace,}$ λ_{max} and Likelihood Ratio Statistics was determined.

The model to be estimated is

$$\Delta X_t = \sum \Pi_i \Delta X_{t-i} + \Pi X_{t-i} + \varepsilon_t \quad (5)$$

where X_t is a (nx1) Vector, Π is ($I-A_1$); where A_1 is a (nxn) parameter matrix, I is an (nxn) identity matrix and ε_t is a (nxn) vector. The test statistics λ_{trace} *and* λ_{max}, are calculated as follows,

$$\lambda_{trace}(r) = -T \hat{A} \ln(1-\lambda_i) \quad (6)$$

$$\lambda_{max}(r, r+1) = -T \hat{A} \ln(1-\lambda_{r+1}) \quad (7)$$

where λ_I is the eigenvalue from P matrix and T is the number of observations. If the calculated λ_{trace} and λ_{max} are less the respective value from the table of distribution of λ_{trace} and λ_{max} , it is concluded that the number of cointegrating vectors is zero, that is, the variables are not cointegrated. If they are found cointegrated then according to Engle and Granger (1987), there must exist an associated error-correction model (ECM). The ECM may take the following form:

$$DYSP_t = h_0 e_{t-1} + \sum_{i=1}^{m} h_i DYSP_{t-1} + \sum_{i=1}^{m} j_i DSEC_{t-1} + S\, q_i DPRS_{t-1} + n_t \quad (8)$$

where e_{t-1} is the error-correction term, m is the optimum number of lags, necessary to obtain white noise and n_t is a random disturbance term. In view of the trade-offs between bias and efficiency of the parameters when the lag orders are changed, Akaike's minimum criterion is used in equations (5) and (8) for selecting the optimum lag lengths.

Refering to equation (8), the error correction term e_{t-1} depicts the extent of disequilibrium between YSP_t, SEC_t, and PRS_t. The ECM further reveals that the change in YSP_t not only depends on lagged changes in SEC_t and PRS_t, but also on its own lagged changes. ECM is appealing because of its ability to induce flexibility by combining the short-run and long-run dynamics in a unified system. Furthermore, the estimates of the parameter of the ECM are generally consistent and efficient.

EMPIRICAL RESULTS

Table 4 shows the results of the Augmented Dickey-Fuller (ADF) unit root tests of the variables in levels as well as in their first differences. The tests include one lag of the variables, because the lag structure of order one was found sufficient to generate stationary residuals. The intercept terms are included in the test equations. These results do not reject the null hypothesis at the 5% level of significance. However, the results reject the null hypothesis of difference non-stationarity for all variables. Since all variables are integrated of order one, Johansen's cointegration test is appropriate to be used.

Table 4
Augmented Dickey-Fuller Unit Root Test

Variable	Level term	First Difference
YSP, Yield spread	-2.76 (1) ^{c}	-5.31 (1) ^{c}*
SEC, Securitisation	-2.49 (1) ^{c}	-7.29 (1) ^{c}*
PRS, Prepayment risk	-2.20 (1) ^{c}	-7.11 (1) ^{c}*

Notes: 1. (*) denotes significance at the 0.01, 0.05 and 0.1 level.
Critical value 1% -3.55
5% -2.91
10% -2.59
2. (1) is the chosen lag length
3. c indicates that intercept is included in the estimation
4. Each time series begins in the third quarter of 1988 and ends in the first quarter of 2003 (*n=59*). Comparisons of test statistics with the 1%, 5%, and 10% critical value suggests that the series are non-stationary in level but stationary in first differences. It was infered that ordinary least squares method is neither correct are appropriate, so the cointegration analysis was recommended.

Since the critical values for the *t*-statistics in the Johansen's test depended on whether or not lags are appropriately included, the lag-length tests based on the AIC (Akaike Information Criteria) minimum were used to select the appropriate lags. The lag-length of 1 was chosen to be included in the cointegration test.

Table 5
Johansen Cointegrating Test Using λ_{max} and λ_{trace} Statistics for Multivariate Model

Null Hypothesis	Alternative Hypothesis		5% Critical Value	10% Critical Value
λ_{trace} *tests*		λ_{trace} *value*		
$r = 0$	$r > 0$	34.07	29.51	26.79
$r \leq 1$	$r > 1$	11.91	15.19	13.24
$r \leq 1$	$r > 2$	4.38	3.97	2.82
λ_{max} *tests*		λ_{max} *value*		
$r = 0$	$r = 1$	22.16	20.78	18.69
$r = 1$	$r = 2$	7.53	14.04	12.09
$r = 2$	$r = 3$	4.38	3.97	2.82

Table 5 gives the results of λ_{trace} and λ_{max} tests for the joint determination of the rank *r* of the cointegrating vector. It shows that, there exists one

cointegrating relationship between yield spread and securitisation. Since 34.07 exceeds the 95% critical value of the λ_{trace} statistic of 29.51, it is possible to reject the null hypothesis of no cointegrating vectors and accept the alternative of one or more cointegrating vectors. However, the test of the null hypothesis $r \leq 1$ against the alternative hypothesis cannot be rejected. The λ_{trace} value of 11.91 is less than 95% critical value of 15.19, thus, the λ_{trace} statistic indicated not more than one cointegrating vector exists.

The λ_{max} statistic, however, does help to clarify the issue. The null hypothesis of no cointegrating vectors ($r = 0$) against the specific alternative $r = 1$ is clearly rejected. The calculated value λ_{max} of 22.16 exceeds the 95% critical value of 20.78. The test of the null hypothesis $r = 1$ against the specific alternative $r = 2$ cannot be rejected at the 95 and 90% levels. The calculated value of λ_{max} is 7.53, whereas the critical values at the 95 and 90% significance levels are 14.03 and 12.09, respectively.

Table 6 reports the Johansen cointegration test using likelihood ratio (LR) statistics for the same multivariate model. The results show that the null hypothesis of no cointegration is rejected. Therefore, we conclude that using λ_{max}, λ_{trace} and likelihood ratio (LR) statistics, these variables are cointegrated.

Table 6
Johansen Cointegration Test Using Likelihood Ratio Statistics for Multivariate Model

Eigenvalue	Likelihood Ratio	5% Critical Value	Hypothesis No. of Vectors
0.322	34.065	29.68	None*
0.124	11.906	15.41	At most 1
0.074	4.379	3.76	At most 2
Unnormalised Cointegrating Coefficients			
YSP	0.139	0.047	0.063
SEC	-0.012	-0.007	0.016
PRS	0.175	-0.109	0.075
Normalised Cointegrating Coefficients : 1 Cointegrating Equation (s)			
YSP	1.000		
SEC	-0.088		
PRS	1.254		
C	1.597		

The long-run relationship implied by this cointegrating vector can be written as:

$$YSP = 1.59 - 0.08\ SEC + 1.25\ PRS \quad (9)$$

If the percentage of securitisation increases by 1%, the yield spread decreases very slightly by only 0.8 basis points. This result is not consistent with earlier studies for the most part. For example, Kolari *et al*. (1998) and Black *et al*. (1981) reported economically significant reductions in home loan rates in response to increased securitisation. Our results suggest that securitisation has a low beneficial effect on mortgage yield spreads and that prepayment risk has a higher effect on yield spread, which is explained by more than 100% of yield spreads.

Table 7
Vector Error Correction Model for the Multivariate Model

	Independent Variables			
Dependent Variable	Δ YSP	Δ SEC	Δ PRS	ECT
Δ YSP	0.36	-4.55	-0.067	-0.15
	(2.82)	(-0.002)	(-0.57)	(-2.09)

Estimation of error correction model will do as the cointegration holds. Table 7 indicates that there is a direct convergence to long-run equilibrium for yield spread, securitisation and prepayment risk. In the presence of deviation from long-run equilibrium in period *t-1*, yield spread rise by 36.1%. However, securitisation and prepayment risk responded very slowly to a deviation from the equilibrium. Hence, it could be said that the speed of the adjustment term is significantly different from zero only for yield spread.

CONCLUSION AND REMARKS

Securitisation has transformed housing finance in Malaysia. While securitisation is known to increase the liquidity of the mortgage market, its benefits to homeowners remain unclear in case of Malaysia. Previous studies found strong evidence of the beneficial loan-rate effects of securitisation. This study, however, suggests that securitisation has a marginal effect on mortgage yield spread. While mortgage securitisation does alter the placement of mortgages between the

originator and the securitiser, the cost of holding the marginal mortgage remains unchanged. In this case, the originator's unaltered marginal profitability condition determines the mortgage rate, and the presence of a securitiser offering a liquid premium does not affect the rate. Even though the prepayment risk has higher effects on lowering mortgage yield spreads than securitisation it, however, has only a moderate effect.

This result could probably imply that there are no contracting mechanisms for removing the barrier that prevents the liquid premium from being passed through as a lower mortgage rate for borrowers. In addition, the banking system is not competition driven, as such the benefits of savings from securitisation are not pass to the borrowers.

Since the study based is on the interest rates, which are, determined in the bond market, the non-liquid secondary bond market in Malaysia could also be a contribution to the result. The Malaysian bond market is non-liquid due to the captive demand for and shortage of supply of papers for the bond market. The inactive MGS market has depressed yields and as a result, these yields cannot serve as good benchmark yields for the corporate bonds. Until 1986, interest rates in Malaysia were highly regulated where the MGS yields were fixed on an administered basis by Bank Negara Malaysia. Since then, although the yields are market determined, the demand for MGS has continued to be captive to the extent that certain investors have been and are required to hold MGS by statutory requirement.

In this paper, a period study was chosen where there were several major reforms had been undertaken to make the bond market more liquid. The study started from 1988, where interest rates were already allowed to be determined by market forces; principal dealers were appointed to underwrite primary issues of MGS and quote two-way prices in the secondary market; a scriptless book-entry securities trading and funds transfer system known as SPEEDS was established; and the liberalisation of the liquid asset requirements of financial institutions was witnessed. According to Thillainathan (1996), even though the demand for MGS is still captive in the late 1980s, due to the government's heavy borrowing, the MGS market was operating along the non-captive segment of the demand curve. The captive element of the market did not distort the MGS prices and yields observed during this period. Only in the mid-1990s were there rising of the MGS prices and declining of yields.

The calculation of yield spread was based on the difference between housing loan rate and MGS rate. Although the MGS rate is based on the secondary bond market rate, the housing loan rate is taken from

the primary market, where the loan rate is the rate paid by the borrower to the banks, and not the mortgage rate that is traded by the investors in the secondary bond market.

Since our interest of this research is to see the impact of securitisation on mortgage market yields, hence, the result is applicable and relevant.

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