



探討住宅抵押貸款違約的因素

林耀宗

Contents



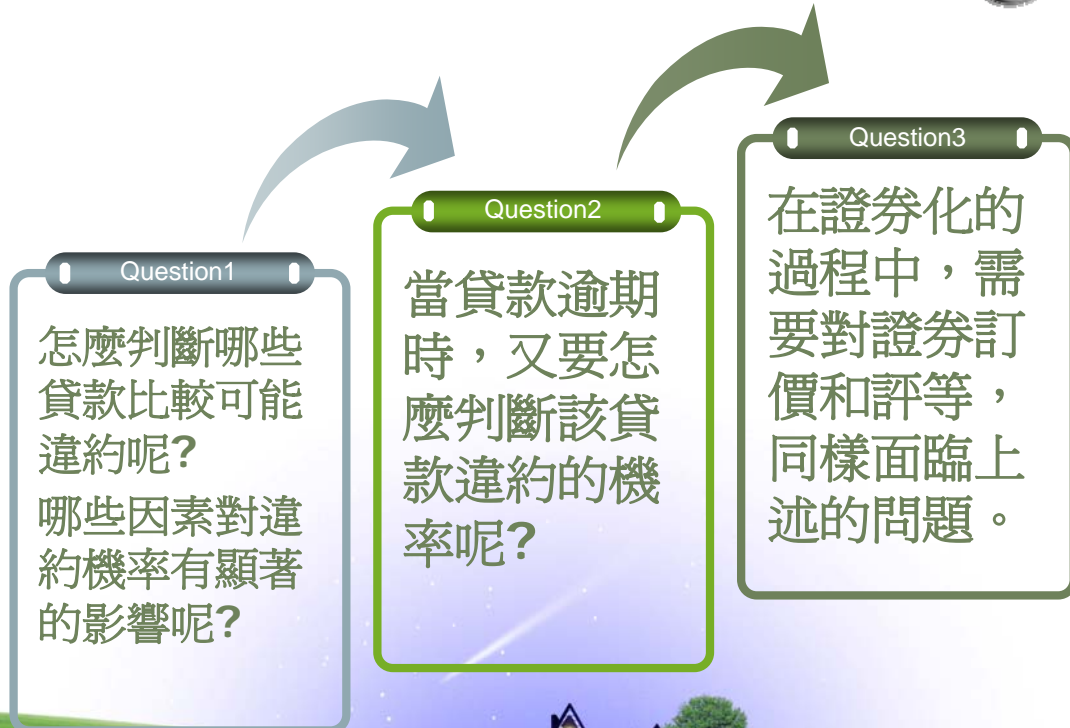
- 1 研究動機
- 2 文獻回顧
- 3 結論
- 4 問題討論





- ❖ 因房價上漲，民眾需要貸款才買得起房子。
先享受後付錢、投資槓桿
- ❖ 銀行辦理購屋貸款承受的風險。e.g. 違約、提前清償、流動性不足
 - 減少風險：審查借款人的個人資料，謹慎訂定貸款契約條件
 - 移轉風險：不動產抵押債權證券化

❖ 但是....





文獻一

住宅抵押貸款違約之研究—影響因素之顯著性分析，2008，楊顯爵、林左裕和陳宗豪

文獻二

A Dynamic Look at Subprime Loan Performance, 2005, Danis & Pennington-Cross

文獻三

Evaluating the Likelihood of Default on Delinquent Loans, 1989, Gardner & Mills



文獻一：

住宅抵押貸款違約之研究—影響因素之顯著性分析



1.住宅抵押貸款違約之研究—影響因素之顯著性分析



- ❖ **DATA**：某大型行庫在高雄市、高雄縣和屏東縣，於1985年撥貸之20年住宅貸款，共2,568筆。並於2005年觀察各貸款清償或逾期的情形。其中逾期案件277件，還清結案案件2,381件。
- ❖ 根據過往文獻結果與銀行實務考量條件，將影響因素歸納成三類：**借款者特質**、**貸款契約條件**、**總體經濟因素**，並探討影響**住宅貸款逾期**的顯著因素。



表一 本研究之變數說明

變數	符號	說明
住宅抵押貸款繳款逾期與否	Y	被解釋變數，借款者繳交本息遲延超過90天之案件記為1；正常、提前還清及遲延繳款90天以下之案件記為0
年齡	X ₁	連續變項，依借款者貸款當時年齡計算
工作年資	X ₂	連續變項，依借款者總工作年資計算
教育程度	X ₃	虛擬變項，大專以上學歷記為1；其他計為0
職位	X ₄	虛擬變項，軍公醫教及民間企業主管記為1；民間基層人員計為0
婚姻狀況	X ₅	虛擬變項，已婚記為1；其他（未婚、離異者）計為0
家庭收入	X ₆	連續變項，依借款者家庭總收入計算
撫養親屬	X ₇	連續變項，依借款者家庭撫養親屬計算
信用貸款餘額	X ₈	連續變項，依借款者貸款當時在聯徵中心所列金融機構信用貸款餘額計算
信用卡餘額	X ₉	連續變項，依借款者貸款當時在聯徵中心所列金融機構信用卡餘額計算
是否有從債務（保證債務）	X ₁₀	虛擬變項，有從債務記為1；無從債務計為0，依借款者當時在聯徵中心所列是否有保證債務計算
貸款成數	X ₁₁	連續變項，依借款者貸款當時貸款成數計算
貸款期限	X ₁₂	連續變項，依貸款契約貸款期限計算
整批房貸與否	X ₁₃	虛擬變項，整批房貸記為1；非整批房貸計為0
寬限期	X ₁₄	連續變項，依貸款契約借款者申請之寬限期計算
擔保品種類	X ₁₅	虛擬變項，大廈辦公室及大廈店面記為1；其他（透天住宅、透天店宅、大廈住家、公寓）計為0
房屋區域位置	X ₁₆	虛擬變項，抵押房屋位於高雄市記為1；其他（高雄縣及屏東縣）計為0
經濟成長率變化	X ₁₇	連續變項，依行政院主計處季資料提供，以逾期或期滿結案時經濟成長率減撥貸時經濟成長率差額列入計算
失業率變化	X ₁₈	連續變項，依行政院主計處月資料提供，以逾期失業率減撥貸時失業率差額列入計算
利率	X ₁₉	連續變項，依個案銀行相對應借款者所得之利率計算



1.住宅抵押貸款違約之研究—影響因素之顯著性分析



- ❖ 經過顯著性檢定(likelihood ratio卡方統計量)，影響逾期顯著的因素有16個。
- ❖ 再根據AIC和BIC指標，得到各顯著因素的影響排序。

經濟成長率變化	失業率變化	貸款利率	家庭收入
教育程度	有無從債務	貸款成數	職位
寬限期	信用貸款餘額	婚姻狀況	擔保品種類
信用卡餘額	年齡	工作年資	整批房貸否

1.住宅抵押貸款違約之研究—影響因素之顯著性分析



表十 精簡總和「總體經濟因素」及「借款者特質及借款契約條件」各變數之分析結果

變數	參數估計值	標準差	Pr > Chi Square
截距	-11.0452***	2.5721	<.0001
X ₆ 家庭收入	-0.0301***	0.0052	<.0001
X ₁₀ 有無從債務	2.0923***	0.3924	<.0001
X ₁₁ 貸款成數	0.0565***	0.0204	0.0057
X ₁₄ 寬限期	0.4259***	0.1066	<.0001
X ₁₇ 經濟成長率變化	-1.4407***	0.1397	<.0001
X ₁₈ 失業率變化	2.2541***	0.4152	<.0001
X ₁₉ 貸款利率	1.6031***	0.1683	<.0001



文獻二：

A DYNAMIC LOOK AT SUBPRIME LOAN PERFORMANCE



2.A Dynamic Look at Subprime Loan Performance



❖ **DATA** : Loanperformance資料庫，30年期的固定利率貸款，抵押房屋位在都會區。從1996.1到2003.5共22,799筆貸款。

❖ **貸** Exhibit 1: Dynamic Role of Delinquency

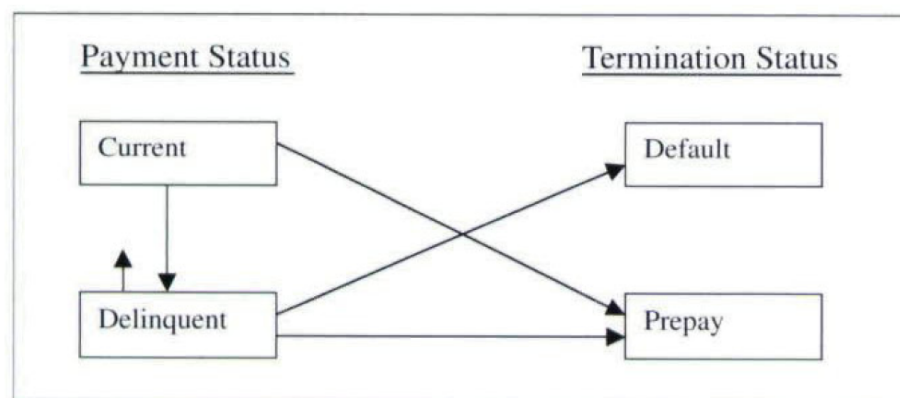


EXHIBIT 2

Description of Variables and Source



Variable	Source	Description
D_q	Loan-level data.	Provides the fraction of the observed life of the loan L_c into the delinquent loan behavior information. Office of Federal Housing and Enterprise Oversight and loan-level data. Shows the current loan-to-value ratio derived from the balance on the loan and the updated value of the value of the property using the metropolitan area repeat sale price index. Also expressed in 100s.
D_p	Loan-level data.	Indicates the credit score at origination reported for the loan. F Loan-level data.
d	Loan-level data.	Indicates the metropolitan area reported unemployment rate for the previous month. U U.S. Bureau of Labor Statistics.
p	Loan-level data.	Indicates that the loan has low or no documentation. LD Loan-level data.
A	Loan-level data.	Provides the change in prevailing prime interest rates from the date of origination to the current date. The Primary Mortgage Market Survey is used. ΔI Freddie Mac.
L	Loan-level data.	Indicates whether a prepayment penalty is in effect for the current month. For example, for a loan with a prepayment penalty that lasts one year $P = 1$ if months ≤ 12 and $P = 0$ if months > 12 . P Loan-level data.
		Identifies 11 companies that provide the data to the repository (LoanPerformance.com). A dummy variable is constructed to capture any unique fixed effects associated with each data provider/servicer. S Pool-level data.

2.A Dynamic Look at Subprime Loan Performance



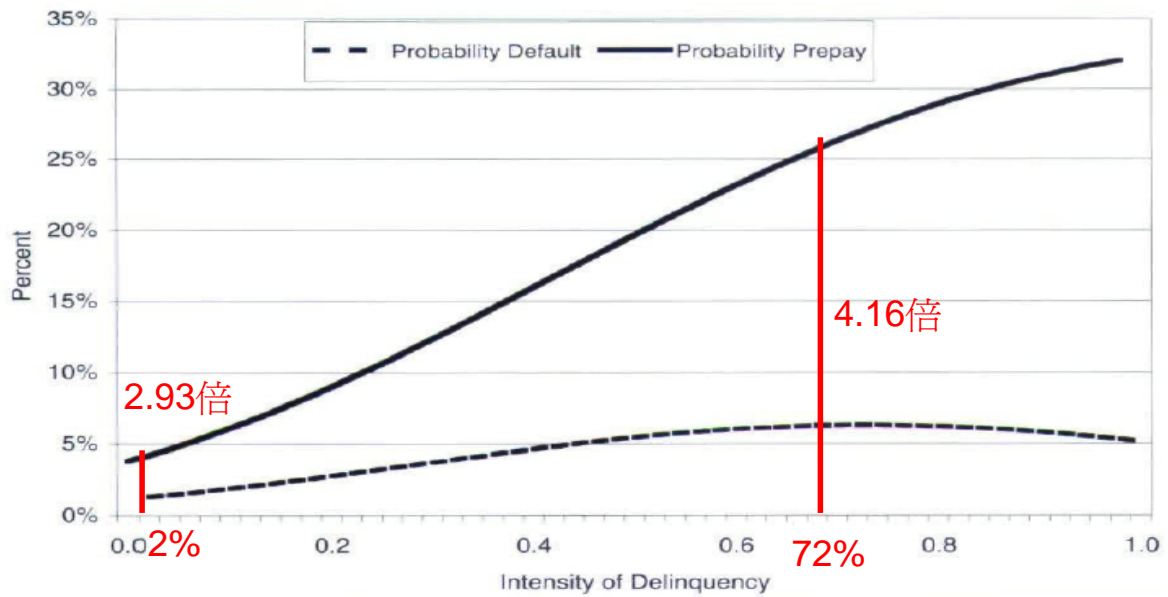
- ❖ 逾期時間佔貸款期間的比例 (**intensity of delinquency**)，其與貸款的違約機率存在**非線性**的關係。
- ❖ “不得已提前清償 (**distressed prepayment**)” 的概念。
- ❖ “**Competing risk**” 的概念。



2.A Dynamic Look at Subprime Loan Performance



Exhibit 7: Effect of Predicted Intensity of Delinquency on Termination



LTV與current LTV



EXHIBIT 8 A

Effect of LTV at Origination on First- and Second-Stage Estimates

Lc超過100%後，違約率呈指數成長。
Lc由100%上升至120%，違約率由6.8%上升至25.9%。



長時間逾期還款下的Lc



Exhibit 9A: Predicted Probability of Prepayment for Various Current Equity Positions and Intensity of Delinquency

		Intensity of Delinquency Rate	
		Low	High
Current LTV*	Low	0.031	0.080
	High	0.023	0.063

當Lc低時，表示房屋的權益是正的，
 借款人有較高機率選擇提前清償。

Exhibit 9B: Predicted Probability of Default for Various Current Equity Positions and Intensity of Delinquency

		Intensity of Delinquency Rate	
		Low	High
Current LTV*	Low	0.001	0.004
	High	0.043	0.091

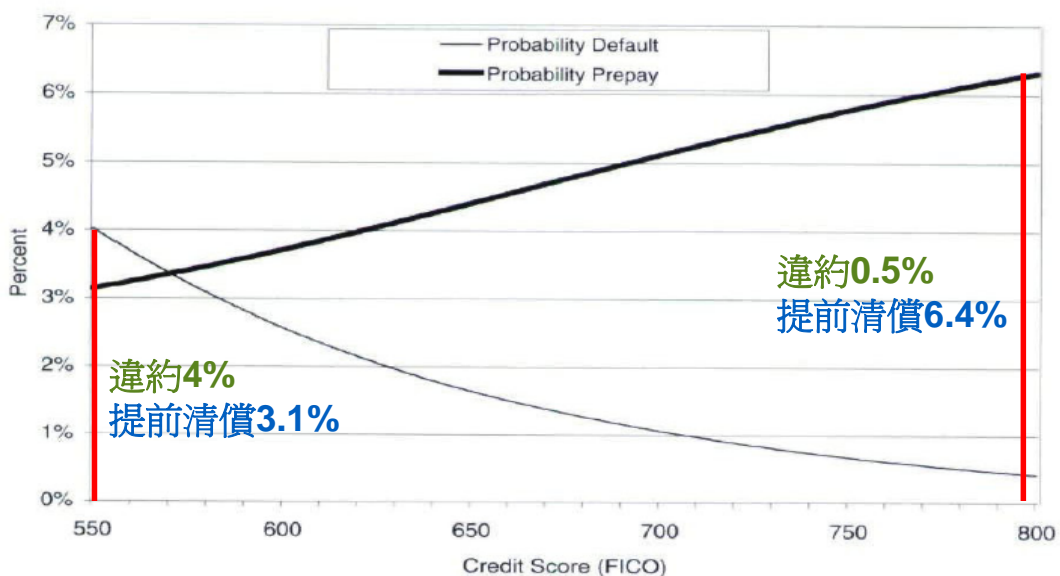
當Lc高時，表示房屋的權益是負的，
 借款人有較高機率選擇違約。



用信用紀錄推測貸款的表現



Exhibit 11: Effect of FICO on Termination



2.A Dynamic Look at Subprime Loan Performance



❖ 小結：

逾期時間佔貸款期間比例(intensity of delinquency)、當下的LTV(current LTV)和FICO分數，三者對於貸款的違約和提前清償機率有顯著的影響。



文獻三：

**EVALUATING THE LIKELIHOOD
OF DEFAULT ON DELINQUENT
LOANS**



3. Evaluating the Likelihood of Default on Delinquent Loans



- ❖ 貸款創始時的條件**無法**有效預測貸款逾期時違約的機率。
- ❖ 當一貸款**逾期**了，銀行應該要先判斷是否會違約。採取法律行動必須負擔成本，所以除非迫不得已，銀行會避免尋求法律途徑。
- ❖ **DATA**：從1979.1到1985.6，逾期超過90天的貸款，共713筆。Federal Home Loan Bank of Chicago。



3. Evaluating the Likelihood of Default on Delinquent Loans



- ❖ 逾期時的借款人和抵押品特徵可以更有效解釋違約的機率。

Exhibit 2. Chi-Square Tests of Independence: Information at Delinquency and at Time of Application

Variable	Number of Cases	Chi-Square	Significance	Remarks
<i>Panel A. Information at Time of Delinquency</i>				
<u>Reason for delinquency</u>	713	29.82	0.001	Loss of job higher for foreclosed group; illness/death, financial/legal problems higher for current group.
<u>Existence of a previous delinquency</u>	704	40.94	0.001	Current group more likely to have a previous delinquency.
<u>Year of delinquency</u>	713	13.32	0.050	Loans that became delinquent in 1980 and 1981 more likely to be in current group.
<u>Borrower occupation at delinquency</u>	697	16.69	0.050	More professional/managerial or factory workers in current group; more self-employed or sales in foreclosed group.
Change in occupation	694	2.96	ns ^d	
Change in marital status	707	1.47	ns	
<u>Location</u>	711	29.20	0.001	Borrowers in rural areas or in "white collar" towns more likely to become current.
<u>Property occupancy at delinquency</u>	662	54.35	0.001	Foreclosed properties more likely to be non-owner occupied or vacant.
Condition of property at delinquency	316	5.33	ns	

3. Evaluating the Likelihood of Default on Delinquent Loans



Panel B. Information at Time of Application

<u>Borrower occupation at application</u>	708	16.24	0.050	More professional/managerial, other white collar, or factory workers in current group; more self-employed or sales in foreclosed group.
Co-borrower occupation at application	585	5.24	ns	
Marital status	710	0.02	ns	
Borrower's sex	708	0.00	ns	
Borrower's credit record	656	2.42	ns	
Property new or existing	702	0.29	ns	
Property occupancy at application	685	1.56	ns	
Purpose of loan	706	3.65	ns	
Appraiser's comments; trends in property value	618	1.62	ns	

^aNo significance.



T-test



Exhibit 3. T-Tests for Mean Differenc: Information at Delinquency and at Time of Application

Variable	Number of Cases	T-Value	Significance	Remarks
<i>Panel A. Information at Time of Delinquency</i>				
<u>Balance/Value at delinquency</u>	234	-5.55	0.001	Significantly higher for foreclosed group.
Balance at delinquency/Appraised value	594	-1.54	ns ^a	
<u>Age of loan</u>	710	3.13	0.010	Significantly greater for current group.
<i>Panel B. Information at Time of Application</i>				
<u>Loan amount/Appraised value</u>	705	-2.09	0.050	Significantly higher for foreclosed group.
Loan amount/Purchase price	532	-0.53	ns	
<u>Payment/Income ratio</u>	641	-1.98	0.050	Significantly higher for foreclosed group.
<u>Rate of interest</u>	710	-3.40	0.001	Significantly higher for foreclosed group.
<u>Original maturity</u>	706	-2.29	0.050	Significantly greater for foreclosed group.
Borrower's age	695	1.20	ns	
Number of dependents	687	0.41	ns	
<u>Age of property in years</u>	688	-2.19	0.050	Significantly higher for foreclosed group.

^aNo significance.



3. Evaluating the Likelihood of Default on Delinquent Loans



Exhibit 4. Results: Logit Regression (* indicates significance at the 0.10 level)

Variables	Model 1		Model 2		Model 3	
	Coefficient	t-Value	Coefficient	t-Value	Coefficient	t-Value
Initial Loan/Appraised Value	2.8563	2.1600*				
Initial Loan/Purchase Price			1.6930	1.4510		
Delinquency Balance/Appraised Value					1.1633	1.5270
Monthly Payment/Monthly Income (PI)	0.7384	0.6983	0.2848	0.1844	-0.3850	-0.2949
Initial Loan Term	0.0012	0.3287	0.0023	0.5241	0.0052	1.3720
Age of Loan at Delinquency	-0.0302	-1.5370	-0.0357	-1.4310	-0.0320	-1.6980*
Age of Loan Squared	0.0001	0.7915	0.0003	1.6080	0.0002	1.3400
Age of Property	0.0136	2.2090*	0.0125	1.7340*	0.0162	2.5270*
Rural or Small Town Location	0.5717	2.3640*	0.4189	1.5610	0.6075	2.3200*
"White Collar" MSA #1	-0.7310	-2.6030*	-0.7754	-2.4760*	-0.2595	-0.9468
"White Collar" MSA #2	-1.0297	-2.2090*	-0.5189	-1.0660	-1.1289	-2.4110*
"Blue Collar" City	1.1890	3.8740*	0.8754	2.3960*	0.7810	2.5010*



3. Evaluating the Likelihood of Default on Delinquent Loans



Reason for Delinquency

Not Identifiable	-0.5076	-1.3010	-0.2179	-0.5332	-0.5146	-1.2960
Divorce	-0.3295	0.6826	0.2653	0.4544	-0.4247	-0.7719
Illness or Death	0.1813	0.3535	-0.9994	-1.3180	0.2739	0.5348
Loss of Job	0.8782	3.1630*	1.2250	3.7410*	0.8810	2.9040*
Reduced Income	-0.2658	-0.8200	-0.3588	-0.9176	-0.3541	-1.0520
General Financial Problems	0.0434	0.1415	-0.0862	0.2290	0.1385	0.4073
No Previous Delinquency	0.4787	3.3040*	0.8859	5.0480*	0.7327	4.6180*
Previous Delinquency	-0.4787	-3.3040*	-0.8859	-5.0480*	-0.7327	-4.6180*



結論



- ❖ 影響違約的因素會隨著地區和樣本的不同，而有不同的顯著因素。
- ❖ 貸款逾期時，用逾期時的條件判斷違約機率會有較佳的效果。



LOGO

參考文獻

- 1.住宅抵押貸款違約之研究—影響因素之顯著性分析，2008，楊顯爵、林左裕和陳宗豪，台灣土地研究Vol.11 No.2 pp.1~36
- 2.A Dynamic Look at Subprime Loan Performance, 2005, Michelle Danis & A. Pennington-Cross, The Journal of Fixed Income
- 3.Evaluating the Likelihood of Default on Delinquent Loans , 1989, Mona J. Gardner and Dixie L. Mills, Financial Management



Thank You !

問題討論



1. 因為證券化的機制，銀行得以將貸款的風險移轉給投資人，是否會使銀行放寬審查的標準？是否會因此使次級房貸增加？
2. 若一貸款曾經逾期還款過，當其再次逾期時，是否會提高該貸款的違約機率？換句話說，兩個逾期的貸款，一個之前有逾期記錄，一個沒有，哪一個的違約機率較高呢？
3. 銀行可不可以向借款人收取“提前清償罰金”？理由何在？

