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Life Cycle, Mortgage Payment, and Forced Savings

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A common puzzling phenomenon over the household survey of Taiwan is that the renters' saving rate is higher than that of the owners', while the latter has a higher average income than the former. One reason for this feature is that certain housing owners have to pay a greater amount of mortgage payment that is not included in saving. And on the other hand, the saving decision is correlated with the tenure decision, while the tenure decision is also correlated with the household's life cycle, in addition to income. And therefore, when one tries to estimate the correct saving rate, he or she has to consider the household's life cycle as well.

In this study, we apply a data set of the household survey of Taiwan to investigate the correlation of life cycle, mortgage payment, and forced savings. First of all, we estimate the saving rate in a traditional way, and then estimate the saving rate after the adjustment of mortgage payment. To figure out the correct saving rate with the tenure decision, we evaluate different households' saving behaviors according to different cohorts, and consequently, we could check how life cycle plays its role in this model. And our finding is, that for every cohort, the forced savings is significant for owners with mortgage and for renters as well.

Keywords:

Life Cycle, Mortgage Payment, Forced Savings

Introduction

In Taiwan, due to the rapid economy development and the fast income increase, the percentage of household expenditure on food, beverage and tobacco has decreased while that on rent, fuel and power has increased.¹ It is clear that a large portion of the total expenditure is spent on housing because of the high housing price, and it implies that the household consumption and the saving behavior might be heavily influenced by the housing price as well.

At the same time, a common puzzling phenomenon over the household survey of Taiwan is that the renters' saving rate is higher than that of the owners', while the latter has a higher average income than the former. One reason for this feature is that certain owners have to pay a greater amount of mortgage payment that is not included in saving, neither in the disposable income.²

Recently, there are quite a few literatures studying the relationship between the saving behaviors and the tenure choices. For example, Hendershott and Peek (1989), Krumm and Kelly (1989), Skinner (1989), and Hsueh and Lee (1998) all believe that the saving behaviors and the tenure choices are simultaneously determined. Krumm and Kelly (1989) find that people have to save a greater amount of down payment in order to purchase a house when the housing price is increasing. And after buying the house, households have to borrow from banks and start paying a relative amount of mortgage payment. Also, Wang and Lee (1987) find that there are 13.4% households whose priority saving purpose is to buy a house in the future. Furthermore, Hsueh and Chen (1998) determine that the owners' income is more stable than the renters', and the former has a higher propensity to consume on non-housing commodities. And Hsueh and Lee (1998) find that the income elasticity on housing demands of renters is higher than that of owners in Taiwan. Moreover, Deaton and Paxson (1993) have discussed the relationship of the saving decision with the tenure choice and the life cycle; they believe that the mortgage payment is part of savings, and Tachibanaki (1994) thus named it the "forced savings".

¹ In the Survey of Family Income and Expenditure of Taiwan, the variation on the distribution of the household's total expenditure from 1980 to 1996 is, that the percentage on food, beverage and tobacco has decreased from 40.4% to 26.1%, while the percentage on rent, fuel and power has increased from 23.7% to 25.3%.

² This is the official definition of the household's savings in the household survey of Taiwan.

Clearly, the saving decision is correlated with the tenure decision, while the tenure decision is also affected by the household's life cycle, in addition to income. Therefore, in order to estimate the correct saving rate, the tenure decision and the household's life cycle effects have to be considered at the same time.

If we separate the owner-occupied households into two types, i.e. households with and without mortgage, we find that the saving rate for housing owners without mortgage would not only be much higher than that for housing owners with mortgage, but would also be higher than that for renters. And without doubt, if the mortgage payment were not to be considered as part of savings, we would only get an underestimated saving rate.

However, what indeed is the real saving for the owner-occupied households with mortgage? How do we estimate their saving rates without bias? And how does the saving decision interact with the tenure decision, and with the life cycle? In this study, we use a data set of the household survey of Taiwan to answer the above questions. We firstly estimate the saving rates of various housing ownerships, and then we further estimate the saving rates after the adjustment of the mortgage payment. And in order to figure out the correct saving rate with the tenure decision across the life span, we will evaluate different households' behaviors according to different cohorts, and consequently, we could observe the role that life cycle has played in this model. And finally, we will assess the magnitude of the forced savings for different cohorts.

The theoretical discussion and the literature review of the relationship between the saving decision with the tenure choice and the life cycle is introduced in Section 2. And in Section 3, we use the data of Survey of Family Income and Expenditure (SFIE) of Taiwan to compute the correct forced savings, and then we compare the unadjusted saving rate with the adjusted saving rate according to different cohorts. And Section 4 concludes this study.

The Relationship between Saving Decision, Tenure Choice, and Life Cycle

It is commonly observed that a household's saving rate varies with the household head's life cycle. For example, as the household head gets his/her first job, he/she tends to save a relatively large portion of his/her income, for that the household head is obliged to save more in order to deal with possible

income uncertainties in the future. And after a few years of working, the household head may consider buying a house or getting married.

As he/she gets married and has children, the household's saving rate would thus be dropping since it costs a great deal to support the family and to raise the children. On the other hand, the household's total income will be growing as the head is aging, and the saving rate will reach its peak before the household head retires. And after the head's retirement, the household's saving rate will drop sharply along with the drastic decrement of the total income.

In general, the saving rate is not only affected by the family structure, but affected by the decision of the tenure choice as well, for that owning or renting a house implies a totally different expenditure stream. For example, if a household plans to buy a house, it has to save a lot for a significant amount of down payment. And after the purchase of the house, the household has to cut down its consumption expenditure to some extent so as to pay for the mortgage. And for the reason that the credit market is relatively primitive in Taiwan, the mortgage payment period is thus shorter in comparison with that in other developed countries. And as a result, the burden of the high housing price and the heavy mortgage payment would then make the housing purchase a sophisticated decision.

Moreover, there are several characteristics, such as expensiveness, durability, and immobility, which will admit housing to be different from a consumption commodity. Firstly, housing is so expensive that it is one of the most important assets for households.³ People have to save a great amount of money as a down payment for the housing purchase and it is the main reason for which the renters' saving rate is usually high since they have the intention to buy houses.⁴ And generally speaking, people have to save hard for the down payment and the mortgage payment if they plan to buy or have already bought a house.⁵

Secondly, there is an investment motive, too, for the housing purchase on account of the housing durability. Housing is certainly an important item in

³ In 1979, the housing unit is the most important single asset for most households in America, and its worth is about 30% of the total assets. See Skinner (1994), p.191.

⁴ In a household survey of Japan, the motive on saving for housing purchase accounts for around 15% for a household. See Tachibanaki (1994), p.164. Horioka (1988) has also found that renters in Japan would increase their savings as soon as the housing price goes up.

⁵ Tachibanaki and Shimono (1988) have found that more than one half of the total savings in Japan is the forced savings, and the greatest portion of the household saving is meant for the mortgage payment.

the household's asset portfolio;⁶ though most families would own one house only, their decisions on purchasing a house usually include the consumption motive and the investment motive simultaneously.⁷

Due to the immobility of the housing unit, the housing demand and the tenure choice are of a joint decision.⁸ Generally speaking, one would get a biased estimation of the housing demand if he/she neglected the household's tenure choice. And to put it broadly, factors that affect the housing demand include saving, liquidity constraint, mortgage, and tenure choice. Furthermore, the investment incentive and the portfolio choice will affect behaviors on housing purchase and housing expenditure as well.

Variation of the housing price will change the household's consumption and saving behaviors. Horioka (1988) has found that the increment in saving is accompanied by a higher housing price in Japan, and thus, for renters, they then have to save more if they want to buy a house when the housing price increases. However, if the housing price were too high to be affordable, some despaired renters might simply give up their dreams of being housing owners and would increase their consumptions instead. Sheiner (1995) has utilized the US data and determined that the renters' saving rate is lower in areas with expensive housing. And in contrast, Bosworth, Burtless, and Sabelhaus (1991) examine the Canadian data and find that there is no significant effect over the saving rate when the housing price goes up. Lin and Wang (1997) found that the housing price variation substantially explains the decrease of the saving rate in Taiwan.

Nevertheless, the above literature neglects a possible effect of the variation of the housing price over the household's saving behavior. When the housing price keeps increasing, some potential homebuyers may delay their purchase plans, and if they still want to buy the houses, they would have to accumulate more money for a longer period of time. And since the mortgage payment will increase, new homebuyers are forced to save more in order to be financially able to pay for the monthly payment. Thus, the saving rate of the homebuyers should be higher when the housing price goes up.

⁶ See Bosch, Morris, and Wyatt (1986), Manchester and Poterba (1989), and Berkovec (1997).

⁷ Berkovec and Fullerton (1989), and Henderson and Ioannides (1987) have provided excellent theoretical models discussing the housing consumption and the investment. Lin and Lin (1999) have also estimated the respective shares of consumption and investment motives of the housing demand in Taiwan. And they found that for a household possessing only one house, the shares are 26.3% and 73.7%, individually.

⁸ There are numerous literatures analyzing the relationship between the tenure choice and the housing demand. For example, Henderson and Ioannides (1987), Bosch, Morris, and Wyatt (1986), Lin (1990, 1993, 1994), Lin and Lin (1996), and Hsueh and Chen (1998).

When comparing the actual saving rates for homeowners with and without mortgage, we usually find that the average saving rate for the former is much higher than that for the latter. In other words, the observed saving rate for homeowners with mortgage is much lower than what it is supposed to be. And the problem is on the definition of the household's saving rate. Usually, the household's saving is computed as a residual, i.e. the disposable income minus the consumption expenditure. Mortgage payment in this survey is considered as part of the outlay, and the disposable income is the total income minus the outlay. Thus, the mortgage payment is not included in the disposable income, neither is it included in savings. And under this definition, the investment nature in the mortgage payment is not to be considered. In like manner, the saving rate for a homeowner with mortgage would be underestimated for that a large amount of monthly mortgage payment is excluded from the household savings.

To estimate the correct saving rate, we use a data set from the SFIE of Taiwan to explain the relationship between the mortgage payment and the forced savings.⁹ We separate the owner-occupied households into two subgroups, i.e. households with and without mortgage payment. First of all, we calculate the average saving rates for these two groups under the traditional definition and examine their differences. Then we add back the mortgage payment as part of savings into the total savings for the homeowners and recalculate the differences between these two types of housing owners. In order to get a correct saving function for the households, we will control the household's characteristics and the life cycle effects in detail.

Mortgage Payment and Forced Savings: A Case Study of Taiwan

Data Description

In this study, we use the SFIE of Taiwan conducted by the Directorate-General of Budget, Accounting and Statistics (DGBAS) in 1996 to estimate the forced savings. There are 12,757 effective samples, and within which 8,226 are for owners with no mortgage, 3,280 for owners with mortgage payments, and 1,194 for renters. The detailed definition of the variables is in Appendix A.

Basic statistics of the three types of households is shown in Table 1. It shows that the disposable income and the consumption for owners with mortgage are the highest (NT\$935,544.14 and NT\$762,227.55) among the three

⁹ Lin and Chen (1998) is a prelude of this analysis.

types of households. And for owners without mortgage, the disposable income and the consumption are NT\$844,456.93 and NT\$605,798.54, and for renters, NT\$725,859.47 and NT\$546,682.22, respectively. And the average saving rates for the three types of households in order are 10.49%, 21.37%, and 20.78%, and the total saving rates are 18.53%, 28.26%, and 24.68%.

Since the mortgage payment is part of savings in its nature, we then try to put it back into the disposable income and to savings. However, only the net mortgage payment is being added back, and the interest payment arising with the mortgage is excluded since it is simply pure expenditure and could not preserve the household's purchasing power at all.¹⁰ We thus call the saving rate that includes the mortgage payment "the adjusted saving rate". And for the same reason, the total saving rate with the mortgage payment is called "the adjusted total saving rate."

Since the mortgage payment is considered to be part of the household savings in this study, we would compute the adjusted saving rate hereafter. And for owners with mortgage, the average saving rate has increased from 10.49% to 16.11%, and the total saving rate has increased from 18.53% to 24.94% accordingly, after the adjustment. And these rates are very close to that for owners without mortgage.

Furthermore, when comparing owners with and without mortgage payment, the imputed rent for the former (NT\$151,188.97) is higher than that for the latter (NT\$116,067.73). And it is an indication that the housing value of households with mortgage is higher than that of households without mortgage. And the actual rent for renters (NT\$122,115.16) is about the same as the imputed rent for owners without mortgage.

And regarding family characteristics, family size and the number of earners within a household, conditions like these for owners with mortgage are greater than that for owners without mortgage. And accordingly, renters have a smaller family size and earn less than owners with and without mortgage. Similarly, the educational level is the highest for owners with mortgage, then owners without mortgage, and the lowest for renters. And as for the head's age, owners without mortgage are the oldest, then renters, and owners with mortgage are the youngest.

Moreover, we would like to know the basic statistics with regard to different cohorts. We separate the heads by age into five groups, within which are age 25-34, age 35-44, age 45-54, age 55-64, and over age 65. The results are shown

¹⁰ One important reason that we could think of the household's mortgage payment as part of savings is because that it preserves the household's purchasing power for the future.

in Table 2 to Table 6.

Table 1. Basic Statistics (Unit: NT\$)

Dev	Owners w/ Mortgage		Owners w/o Mortgage		Renters	
	Mean	Std Dev	Mean	Std Dev	Mean	Std
Income, Expenditure and Family Characteristics per household						
Disposable Income (Y _i)	935544.14	537775.14	844456.93	553735.85	725859.47	381013.64
Consumption	762227.55	395108.70	605798.54	345469.01	546682.22	265455.48
Saving (S _i)	173316.59	375280.02	238658.39	374370.23	179177.26	227997.57
Monthly Mortgage Payment ^(a)	19615.65	17155.08	-	-	-	-
Interest Expenditure	155155.70	120129.13	-	-	-	-
Net Loan (M _i)	79932.10	159533.69	-	-	-	-
Average Saving Rate ^(b) (%)	10.49	34.10	21.37	28.13	20.78	21.68
Total Saving Rate ^(c) (%)	18.53	-	28.26	-	24.68	-
Adjusted Saving Rate ^(d) (%)	16.11	1.13	-	-	-	-
Adjusted Total Saving Rate ^(e) (%)	24.94	-	-	-	-	-
Non-Consumption Expenditure	328334.88	179374.05	146351.95	121891.16	114933.38	77871.66
Rent and Water Fee	174928.68	98841.92	134418.94	96148.01	127544.72	76920.14
Rent ^(f)	151188.97	72548.71	116067.73	73396.74	122115.16	74621.05
Family Characteristics^(g)						
Family Size (persons)	4.04	1.43	3.93	1.80	3.66	1.52
Number of Earners (persons)	1.79	0.84	1.72	0.91	1.57	0.81
HD_EXIST	1.00	0.00	1.00	0.00	1.00	0.00
SP_EXIST	0.86	0.35	0.76	0.42	0.71	0.45
HD_SEX	1.11	0.32	1.14	0.35	1.18	0.39
HD_AGE (years)	41.31	9.39	46.76	13.46	42.18	11.05
M_EDELEM	0.16	0.37	0.29	0.45	0.27	0.44
M_EDJRHI	0.15	0.36	0.17	0.38	0.20	0.40
M_EDHIGH	0.30	0.46	0.23	0.42	0.25	0.43
M_EDCOLL	0.32	0.47	0.19	0.39	0.13	0.34
F_EDELEM	0.21	0.41	0.31	0.46	0.27	0.45
F_EDJRHI	0.17	0.37	0.13	0.34	0.20	0.40
F_EDHIGH	0.33	0.49	0.21	0.41	0.26	0.44
F_EDCOLL	0.19	0.40	0.10	0.30	0.07	0.26

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No. of Obs.	3211	8008	1194
Notes: ^(a) Monthly mortgage payment includes principal and interest.			
^(b) Average saving rate= $(1/n)\sum(S_i/Y_i)$, where S_i is saving per household and Y_i is disposable income per household.			
^(c) Total saving rate= $\sum S_i/\sum Y_i$.			
^(d) Adjusted saving rate= $(1/n)\sum(M_i+S_i)/(M_i+Y_i)$, where M_i is net mortgage payment.			
^(e) Adjusted total saving rate= $\sum(M_i+S_i)/\sum(M_i+Y_i)$.			
^(f) For renters, rent variable is actual rent payment. For owners, that is imputed rent.			
^(g) The definitions of variables are in Appendix A.			

Table 2. Basic Statistics: Age 25-34 (Unit: NT\$)

	Owners w/ Mortgage		Owners w/o Mortgage			
	Renters	Mean	Std Dev	Mean	Std Dev	Mean
Income, Expenditure and Family Characteristics per household						
Disposable Income (Y_i)	819578.22	403969.86	879225.86	449104.12	716853.86	333804.61
Consumption	683063.14	313833.58	613668.72	282405.41	544375.00	258042.71
Saving (S_i)	136515.08	302881.48	265557.14	335139.17	172478.86	206194.00
Monthly Mortgage Payment	18681.26	16155.11	-	-	-	-
Interest Expenditure	151883.94	99377.93	-	-	-	-
Net Loan (M_i)	72291.19	169327.96	-	-	-	-
Average Saving Rate (%)	9.44	35.35	24.99	27.96	20.93	21.89
Total Saving Rate (%)	16.66	-	30.20	-	24.06	-
Adjusted Saving Rate (%)	17.21	0.35	-	-	-	-
Adjusted Total Saving Rate (%)	23.41	-	-	-	-	-
Non-Consumption	302556.17	136488.29	148848.66	80108.84	114483.75	65184.24
Rent and Water Fee	156892.42	83592.983	132478.12	86782.32	133060.67	71478.01
Rent	136805.24	61113.61	116096.76	70564.22	127593.60	68823.60
Family Characteristics						
Family Size (persons)	3.67	1.51	4.23	1.78	3.43	1.46
Number of Earners	1.77	0.84	1.93	0.97	1.47	0.72
HD_EXIST	1.00	0.00	1.00	0.00	1.00	0.00
SP_EXIST	0.76	0.43	0.57	0.49	0.63	0.48
HD_SEX	1.10	0.30	1.13	0.33	1.20	0.40
HD_AGE (years)	30.76	2.64	30.29	2.72	30.42	2.78
M_EDELEM	0.02	0.15	0.04	0.19	0.04	0.19
M_EDJRHI	0.18	0.39	0.25	0.43	0.29	0.46
M_EDHIGH	0.37	0.48	0.35	0.48	0.35	0.48
M_EDCOLL	0.35	0.48	0.26	0.44	0.16	0.37
F_EDELEM	0.04	0.19	0.05	0.21	0.09	0.29
F_EDJRHI	0.14	0.35	0.16	0.36	0.20	0.40
F_EDHIGH	0.43	0.50	0.33	0.47	0.38	0.49

F_EDCOLL	0.23	0.42	0.14	0.35	0.12	0.32
No. of Obs.	783		1544		297	

Note: See Table 1.

Table 3. Basic Statistics: Age 35-44 (Unit: NT\$)

	Owners w/ Mortgage		Owners w/o Mortgage		Renters	
	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev
Income, Expenditure and Family Characteristics per household						
Disposable Income (Y_i)	921344.54	531520.8	888989.40	498507.9	724191.3	343867.4
		8		1	3	3
Consumption	773340.49	15502.19	666493.59	328288.0	574549.8	254197.3
Saving (S_i)	148004.05	361272.6	223495.81	347732.2	149641.4	194222.3
Monthly Mortgage Payment	20045.65	18216.63	-	-	-	-
Interest Expenditure	156639.44	118810.9	-	-	-	-
Net Loan (M_i)	83908.31	173031.4	-	-	-	-
Average Saving Rate(%)	8.10	34.59	20.10	25.40	17.55	21.16
Total Saving Rate (%)	16.06	-	25.03	-	20.66	-
Adjusted Saving Rate (%)	11.65	1.66	-	-	-	-
Adjusted Total Saving Rate	23.07	-	-	-	-	-
Non-Consumption	331406.54	174402.9	161463.94	107679.1	123012.4	78735.37
Rent and Water Fee	176604.72	105839.4	139481.38	91896.39	128797.7	74761.21
Rent	153293.93	73456.22	123334.22	71930.93	122727.6	71814.43
Family Characteristics						
Family Size (persons)	4.21	1.26	4.56	1.60	3.97	1.26
Number of Earners (persons)	1.63	0.65	1.62	0.75	1.45	0.61
HD_EXIST	1.00	0.00	1.00	0.00	1.00	0.00
SP_EXIST	0.88	0.32	0.82	0.38	0.79	0.41
HD_SEX	1.11	0.31	1.12	0.32	1.20	0.40
HD_AGE (years)	39.30	2.85	39.61	2.82	39.48	2.86
M_EDELEM	0.13	0.34	0.20	0.40	0.27	0.44
M_EDJRHI	0.15	0.36	0.22	0.41	0.20	0.40
M_EDHIGH	0.31	0.46	0.30	0.46	0.27	0.44
M_EDCOLL	0.34	0.48	0.22	0.41	0.15	0.35
F_EDELEM	0.17	0.38	0.25	0.43	0.26	0.44
F_EDJRHI	0.19	0.39	0.20	0.40	0.27	0.45
F_EDHIGH	0.36	0.48	0.30	0.46	0.29	0.46
F_EDCOLL	0.22	0.41	0.14	0.35	0.07	0.25
No. of Obs.			1416		2514	
503						

Note: See Table 1

Table 4. Basic Statistics: Age 45-54 (Unit: NT\$)

	Owners w/ Mortgage		Owners w/o Mortgage		Renters	
	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev
Std Dev						
Income, Expenditure and Family Characteristics per household						
Disposable Income (Y_i)	1045471.0	539903.10	977613.49	595469.22	850862.84	440778.97
Consumption	843877.98	408947.77	694391.26	369506.54	590399.84	255676.56
Saving (S_i)	201593.03	381457.92	283222.23	409804.28	260463.00	299161.85
Mortgage Payment per	20272.73	16566.46	-	-	-	-
Interest Expenditure	158978.67	132964.63	-	-	-	-
Net Loan (M_i)	84294.05	139500.18	-	-	-	-
Average Saving Rate (%)	12.36	32.39	23.06	28.18	25.51	19.73
Total Saving Rate (%)	19.28	-	28.97	-	30.61	-
Adjusted Saving Rate (%)	18.95	0.30	-	-	-	-
Adjusted Total Saving Rate	25.31	-	-	-	-	-
Non-Consumption	351843.28	200071.21	170948.82	125413.31	127037.23	85350.50
Rent and Water Fee	190592.43	99196.28	150174.68	99149.23	137626.19	77172.83
Rent	1045471.0	79794.76	124362.23	71735.09	132111.24	76203.73
Family Characteristics						
Family Size (persons)	4.24	1.38	4.21	1.57	3.97	1.64
Number of Earners (persons)	2.03	0.95	1.96	0.99	1.95	1.02
HD_EXIST	1.00	0.00	1.00	0.00	1.00	0.00
SP_EXIST	0.90	0.30	0.86	0.35	0.76	0.43
HD_SEX	1.15	0.36	1.15	0.35	1.17	0.37
HD_AGE (years)	48.51	2.93	48.87	2.93	48.68	2.84
M_EDELEM	0.31	0.46	0.41	0.49	0.43	0.50
M_EDJRHI	0.13	0.33	0.14	0.35	0.14	0.35
M_EDHIGH	0.23	0.42	0.18	0.38	0.19	0.39
M_EDCOLL	0.25	0.43	0.18	0.39	0.10	0.30
F_EDELEM	0.39	0.49	0.51	0.50	0.48	0.50
F_EDJRHI	0.16	0.36	0.11	0.32	0.13	0.34
F_EDHIGH	0.23	0.42	0.17	0.37	0.15	0.36
F_EDCOLL	0.15	0.36	0.10	0.30	0.05	0.23
No. of Obs.		717		1775		258

Note: See Table 1

Table 5. Basic Statistics: Age 55-64

(Unit: NT\$)

Renters	Owners w/ Mortgage			Owners w/o Mortgage		
	Mean	Std Dev		Mean	Std Dev	Mean
Std Dev						
Income, Expenditure and Family Characteristics per household						
Disposable Income (Y_i)	1125005.6	706186.84	844676.66	622883.33	680854.65	436887.16
Consumption	768807.69	399564.30	558692.11	371818.22	473618.30	294159.19
Saving (S_i)	356197.98	520371.41	285984.55	408797.86	207236.35	243548.19
Mortgage Payment per	19392.13	16922.66	-	-	-	-
Interest Expenditure	161797.53	149867.30	-	-	-	-
Net Loan (M_i)	70908.05	104498.98	-	-	-	-
Average Saving Rate (%)	22.84	29.66	24.15	29.72	25.38	20.44
Total Saving Rate (%)	31.66	-	33.86	-	30.44	-
Adjusted Saving Rate (%)	29.58	0.23	-	-	-	-
Adjusted Total Saving Rate	35.71	-	-	-	-	-
Non-Consumption	355960.43	242898.59	150096.96	176300.43	90232.12	71468.27
Rent and Water Fee	184598.99	98666.61	133247.68	113194.61	118354.36	95290.74
Rent	155309.59	75555.66	111659.57	77977.81	115025.76	94485.97
Family Characteristics						
Family Size (persons)	3.95	1.80	3.34	1.85	3.23	1.74
Number of Earners	2.26	1.15	1.82	1.04	1.82	1.14
HD_EXIST	1.00	0.00	1.00	0.00	1.00	0.00
SP_EXIST	0.89	0.31	0.84	0.37	0.71	0.46
HD_SEX	1.13	0.34	1.15	0.36	1.12	0.33
HD_AGE (years)	58.73	2.75	59.08	2.88	59.14	3.06
M_EDELEM	0.36	0.48	0.53	0.50	0.58	0.50
M_EDJRHI	0.15	0.35	0.10	0.30	0.06	0.24
M_EDHIGH	0.16	0.37	0.12	0.33	0.11	0.31
M_EDCOLL	0.25	0.43	0.10	0.31	0.09	0.29
F_EDELEM	0.42	0.49	0.52	0.50	0.45	0.50
F_EDJRHI	0.14	0.35	0.07	0.25	0.03	0.17
F_EDHIGH	0.12	0.33	0.06	0.23	0.11	0.31
F_EDCOLL	0.11	0.31	0.04	0.21	0.03	0.17
No. of Obs.		219		1160		66

Note: See Table 1

Table 6. Basic Statistics: Age above 65 (Unit: NT\$)

Renters	Owners w/ Mortgage			Owners w/o Mortgage		
	Mean	Std Dev	Mean	Std Dev	Mean	
Std Dev						
Income, Expenditure and Family Characteristics per household						
Disposable Income (Y_i)	811838	856613	448156	489509	357762	264717
Consumption	581509	414838	342402	249278	263981	196459
Saving (S_i)	230328	545649	105754	354729	93782	115379
Mortgage Payment per	15676	11349	-	-	-	-
Interest Expenditure	118689	111892	-	-	-	-
Net Loan (M_i)	69423	80762	-	-	-	-
Average Saving Rate (%)	12.53	31.59	12.86	30.85	21.66	28.10
Total Saving Rate (%)	28.37	-	23.60	-	26.21	-
Adjusted Saving Rate (%)	22.24	0.27	-	-	-	-
Adjusted Total Saving Rate	34.01	-	-	-	-	-
Non-Consumption	235305	178798	57830	79259	37466	43306
Rent and Water Fee	153881	72038	98618	83527	66646	67939
Rent	137992	58065	88558	71798	64311	66721
Family Characteristics						
Family Size (persons)	3.11	1.77	2.10	1.22	1.76	1.18
Earners Number (persons)	1.50	0.92	1.14	0.45	1.19	0.62
HD_EXIST	1.00	0.00	1.00	0.00	1.00	0.00
SP_EXIST	0.88	0.33	0.66	0.47	0.31	0.47
HD_SEX	1.09	0.29	1.20	0.40	1.14	0.35
HD_AGE (years)	69.45	4.58	71.75	5.33	71.59	4.70
M_EDELEM	0.21	0.41	0.42	0.49	0.43	0.50
M_EDJRHI	0.13	0.34	0.10	0.30	0.16	0.37
M_EDHIGH	0.25	0.44	0.10	0.30	0.07	0.26
M_EDCOLL	0.30	0.46	0.08	0.28	0.07	0.26
F_EDELEM	0.38	0.49	0.31	0.46	0.16	0.37
F_EDJRHI	0.20	0.40	0.05	0.22	0.06	0.23
F_EDHIGH	0.09	0.29	0.05	0.22	0.04	0.20
F_EDCOLL	0.08	0.27	0.02	0.14	0.00	0.00
No. of Obs.	76		1015		70	

Note: See Table 1

It is worth to note that for all kinds of households, the level of the disposable income is increasing as the heads are getting older, by age 55. However, there

is a subtle difference, and that is: for owners without mortgage and for renters, their disposable income is decreasing after age 54, and for owners with mortgage, their income keeps increasing till they reach age 64. And one possible reason is that the average age for both kinds of owners is around 40 (more accurately, 41.31) and the period for the mortgage payment in Taiwan is 20 years in general, and therefore, owners with mortgage have to earn more money for this payment.

Adjusted Saving Rates

The comparison of the saving rate for different housing owners categorized by various cohorts is shown in Table 7. The unadjusted average saving rate for owners without mortgage is always higher than that for owners with mortgage. And if we consider the mortgage payment as part of savings and add it into savings, the adjusted saving rates for owners with mortgage will be close to that for owners without mortgage. At the same time, the adjusted saving rate for owners with mortgage would be almost the same as that for renters. Furthermore, the saving rates for owners and renters have reached each individual pinnacle at age 55-64 and age 45-54, respectively, a result that is similar to the findings of Deaton and Paxson (1993), who have also found that the diminishing savings of the elder family does not exist in Taiwan. Therefore, the standard life cycle model does not fit into the behavior of the Taiwanese households.

In the data set, a household's saving rate is calculated as the income residual (i.e. the disposable income minus the consumption expenditure) divided by the disposable income. And "the average saving rate" is computed as the mean of the saving rate for households in the subgroup. On the other hand, "the total saving rate" is defined as the ratio of the total saving (i.e. the total amount of savings for all the households in the subgroup) to the total disposable income (i.e. the total amount of the disposable income for all the households in the subgroup). In general, the total saving rate is higher than the average saving rate since the poor families usually have a smaller amount of income, and therefore, their income would weigh less when it comes to the calculation of the total saving rate.¹¹

Table 7. Households' Saving Rates: Unadjusted v.s. Adjusted (Unit: %)

¹¹ It is easy to explain this result through an example. Suppose that there are two families, the Adams and the Jones, in the economy as a whole. The disposable income for the Adams family is \$100, and the saving rate is 10%. The disposable income for the Jones family is \$200, with a higher saving rate, 20%. Clearly, the average saving rate for the two families is 15%. However, the total saving rate is $(\$100 \times 10\% + \$200 \times 20\%) / (\$100 + \$200) = 16.7\%$.

of Observations	Average	<u>Unadjusted</u>		<u>Adjusted</u>		Number
	Income	Average		Total	Average	Total
	(NT\$,000)	Saving Rate ^(a)	Saving Rate ^(b)	Saving Rate ^(c)	Saving Rate ^(d)	
Owners with Mortgage						
Total Sample	935.5	10.49	18.53	16.11	24.94	3211
Age 25-34	819.6	9.44	16.66	17.21	23.41	783
Age 35-44	921.3	8.10	16.06	11.65	23.07	1416
Age 45-54	1045.5	12.36	19.28	18.95	25.31	717
Age 55-64	1125.0	22.84	31.66	29.58	35.71	219
Age above 65	811.8	12.53	28.37	22.24	34.01	76
Owners without Mortgage						
Total Sample	844.4	21.37	28.26	-	-	8008
Age 25-34	879.2	24.99	30.20	-	-	1544
Age 35-44	889.0	20.10	25.03	-	-	2514
Age 45-54	977.6	23.06	28.97	-	-	1775
Age 55-64	844.7	24.15	33.86	-	-	1160
Age above 65	448.2	12.86	23.60	-	-	1015
Renters						
Total Sample	726.9	20.78	24.68	-	-	1194
Age 25-34	716.9	20.93	24.06	-	-	297
Age 35-44	724.2	17.55	20.66	-	-	503
Age 45-54	850.9	25.51	30.61	-	-	258
Age 55-64	680.9	25.38	30.44	-	-	66
Age above 65	357.8	21.66	26.21	-	-	70

Notes: ^(a) Average saving rate= $(1/n)\sum(S_i/Y_i)$, where S_i is saving per household and Y_i is disposable income per household.

^(b) Total saving rate= $\sum S_i/\sum Y_i$.

^(c) Adjusted saving rate= $(1/n)\sum[(M_i+S_i)/(M_i+Y_i)]$, where M_i is net mortgage payment.

^(d) Adjusted total saving rate= $\sum (M_i+S_i)/\sum(M_i+Y_i)$.

Finally, in order to fully observe the variation of the household's saving behavior, we estimate the saving functions for the three types of households according to their characteristics. Furthermore, we also separate the households into five Taiwanese age groups so that we could trace the saving patterns over the household's life cycle.

What follows is the estimation of the forced savings within the households. Table 7 shows that the average household income for owners with mortgage, owners without mortgage, and renters are NT\$935.5, NT\$844.4, and NT\$726.4 (in thousands), respectively. However, the unadjusted average saving rate for owners with mortgage is 10.49% only, which is much lower than that for owners without mortgage (21.37%), and even lower than that for renters (20.78%). The result is totally against the traditional hypothesis that households with greater incomes would usually have higher saving rates. The reason that the average saving rate for owners with mortgage gets so low is simply because that the mortgage payment is not included in the disposable income nor in savings.

On the second column of Table 7, the adjusted average saving rate for owners with mortgage payment goes up to 16.11%. Though the adjusted average saving rate for owners with mortgage is still lower than that for owners without mortgage (21.37%), the difference is getting smaller, and the discrepancy of the adjusted total saving rates for owners with mortgage and without mortgage is even smaller (24.94% vs. 28.26%). And the adjusted total saving rate for owners with mortgage payment is almost the same as that for renters (24.94% vs. 24.68%).

At the same time, the average income is increasing as the households are getting older, and it is consistent for the three types of households. For owners with mortgage, the average household income reaches its peak when the head is at age 55-64, then drops after his/her retirement. And for owners without mortgage and for renters, the average household income reaches its peak when the head is at the age between 45-54, and drops afterwards.

However, the saving rate has displayed a different pattern when compared with the income stream. For the three types of households, the saving rate is the lowest when the household heads are at age 35-44. One key reason is that the household heads of this range have heavier burdens for the children's educational expenditure than younger and older cohorts. And it is understandable to observe, that the saving rate drops sharply after the household heads' retirement, with two reasons present: first, the household's total income is lower, which indicates a lower saving ability. Secondly, the retired person usually has a lower incentive to save money even if they are capable of doing so, for that their remaining life expectancy is getting shorter.

It is worth to note, that households with loans at age 55-64 tend to have the highest saving rates. And after adding the net mortgage payment, the younger and the elder households will have the saving rates even higher than households without loans and renters. It is obvious that the incomplete capital market prevents the younger generation from financing and purchasing the housing unit. Therefore, they have to utilize most of their savings to pay for the mortgage payment. And consequently, the forced savings for households with mortgage tend to be higher for the younger households.

Generally speaking, the household saving rate is not only affected by the household income, life cycle, and mortgage payment, but also by the household characteristics, such as the household size, the head's education, the head's sex, and so on. Therefore, if we wish to compare the differences in the household's saving rates among different types of households, we have to control their characteristics as well.

In this study, in order to compare the differences in saving rates among the three types of households, we estimate the saving functions for the three types of households by controlling their characteristics. And then we employ the estimated coefficients as the base to calculate the other groups' saving rates, assuming that the other households had similar behavior if they were in the same situation. To save more space, we put the estimated saving functions for the three types of households in Appendix B, where these three types of households with different cohorts are estimated separately.

The essence of this approach is similar to the estimation of the wage differentials for different groups of labor, e.g., Oaxaca (1973). Firstly, we estimate the structure coefficient of the saving function from the base group (e.g., owners without mortgage), and then fit the variables into the corresponding group (e.g., owners with mortgage). The predicted saving rate is viewed as the saving rate that owners with mortgage should have when the mortgage burden is removed. And it is reasonable to expect that the households with mortgage will have higher saving rates if the mortgage burden is removed, while the reverse will be true if households without mortgage are being implemented with the burden of the mortgage payment. Estimations from the alternative base models will provide a "range" of predicted saving rates under various situations.

Predicted saving rates

Tables 8 and 9 show the predicted saving rates under different base models, with the first row as the total samples, then followed by the separated sub-groups at various stages of the life cycle.

All the results are shown in Table 8. First, we compare the differences on saving rates between homeowners with mortgage and without mortgage. In Case I, households without mortgage are employed as the base model. The average saving rate for owners without mortgage is 21.37%, while the total saving rate is 28.26%. Then we employ the estimated coefficients of the saving function of owners without mortgage as a base and put the household's characteristics for owners with mortgage into the function. The estimated average saving rate and the estimated total saving rate are shown on the third and fourth columns in Case I of Table 8. We found that the average saving rate and the total saving rate are 18.04% and 25.42%, respectively, for owners with mortgage if they were to be rid of mortgage burden.

We also utilize the saving behavior of owners with mortgage as a base, and then estimate the saving rates for owners without mortgage, should they have mortgage. The results are shown in Case II of Table 8. We found that the average saving rate for owners without mortgage drops sharply to 14.83% (from 21.27%) if they were to pay for the mortgage payment. At the same time, the total saving rate drops from 28.26% to 21.24%.

However, the estimated saving rates for owners with mortgage under the behavioral structure of owners without mortgage are still lower than that for owners without mortgage. And the problem occurred should be owing to the existence of the forced savings. In Case III and Case IV, we incorporate the net mortgage payment into savings and the disposable income for owners with mortgage. And then we redo the same procedure as Case I and Case II to calculate the saving rates for the two types of owners. In Case III, we found that the adjusted average saving rate and the adjusted total saving rate for owners with mortgage are 21.25% and 28.28%, if they were not to have mortgage burden, and were very similar to the figures for owners without mortgage (21.37% and 28.26%). Furthermore, if we utilize owners with mortgage as a base, we found that the average saving rate and the total saving rate for owners without mortgage are 18.65% and 25.04%, if they were to pay for the mortgage payment, and again, were very close to the figures for owners with mortgage (16.11% and 24.94%).

Table 8. The Estimation of Saving Rates: Owners with and without Mortgage
Units: %

Owners w/ Mortgage		Owners w/o Mortgage		No. of Obs.
Average Saving Rate	Total Saving Rate	Average Saving Rate	Total Saving Rate	

Traditional method: disposable income and saving excluding net mortgage payment

Case I: Basic model---owners without mortgage

Total	21.37(a)	28.26	18.04(b)	25.42	8008
Age 25-34	24.99	30.20	19.52	25.58	1544
Age 35-44	20.10	25.03	17.57	23.37	2514
Age 45-54	23.06	28.97	20.10	26.11	1775
Age55-64	24.15	33.86	22.68	33.16	1160
Age above 65	12.86	23.60	15.31	33.04	1015

Case II: Basic model---owners with mortgage

Total	14.83(b)	21.24	10.49(a)	18.53	3211
Age 25-34	14.59	20.59	9.44	16.66	783
Age 35-44	9.73	17.22	8.10	16.06	1416
Age 45-54	16.15	21.27	12.36	19.28	717
Age55-64	17.89	30.03	22.84	31.66	219
Age above 65	24.91	30.88	12.53	28.37	76

Adding Forced Saving

Case III: Basic model---owners without mortgage

Total	21.37(a)	28.26	21.25(c)	28.38	8008
Age 25-34	24.99	30.20	23.57	28.76	1544
Age 35-44	20.10	25.03	20.13	28.72	2514
Age 45-54	23.06	28.97	27.00	35.39	1775
Age55-64	24.15	33.86	19.63	34.71	1160
Age above 65	12.86	23.60	10.38	17.10	1015

Case IV: Basic model---owners with mortgage

Total	18.65(c)	25.04	16.11(d)	24.94	3211
Age 25-34	18.66	24.44	17.21	23.41	783
Age 35-44	13.16	20.86	11.65	23.07	1416
Age 45-54	20.26	25.06	18.95	25.31	717
Age55-64	25.05	34.31	29.58	35.71	219
Age above 65	32.11	35.56	22.24	34.01	76

Notes: (a) Actual saving rate.

(b) Estimated saving rate, net mortgage payment is excluded neither in disposable income, nor in saving.

(c) Estimated saving rate, net mortgage payment is included both in disposable income and in saving.

(d) Actual saving rate, net mortgage payment is included both in disposable income and in saving.

Table 9. The Estimation of Saving Rate between Renters and Housing Owners
(Units: %)

Life Cycle, Mortgage Payment, and Forced Savings 129

	Owners with mortgage		Owners without mortgage	
	Average Saving Rate	Total Saving Rate	Average Saving Rate	Total Saving
Rate				
Case I: Basic model---owners without mortgage				
Total	21.37(a)	28.26	13.31(b)	19.17
Age 25-34	24.99	30.20	15.50	19.90
Age 35-44	20.10	25.03	14.53	17.21
Age 45-54	23.06	28.97	18.44	23.46
Age 55-64	24.15	33.86	5.62	18.67
Age above 65	12.86	23.60	5.67	14.32
Case II: Basic model---renters				
Total	28.59(b)	32.74	20.78(a)	24.68
Age 25-34	29.85	31.62	20.93	24.06
Age 35-44	22.67	26.26	17.55	20.66
Age 45-54	31.87	38.61	25.51	30.61
Age 55-64	34.04	41.83	25.38	30.44
Age above 65	17.82	33.72	21.66	26.21
	Owners with mortgage		Renters	
Case III: Basic model---owners with mortgage				
Total	10.49(a)	18.53	4.96(b)	11.90
Age 25-34	9.44	16.66	6.25	11.64
Age 35-44	8.10	16.06	- 1.03	7.61
Age 45-54	12.36	19.28	13.04	17.53
Age 55-64	22.84	31.66	- 7.65	12.95
Age above 65	12.53	28.37	41.97	37.15
Case IV: Basic model---renters				
Total	24.24(b)	30.19	20.78(a)	24.68
Age 25-34	24.25	27.93	20.93	24.06
Age 35-44	20.36	25.52	17.55	20.66
Age 45-54	29.02	35.85	25.51	30.61
Age 55-64	34.35	41.24	25.38	30.44
Age above 65	21.34	44.19	21.66	26.21
	Owners with mortgage		Renters	
Adding Forced Savings				
Case V: Basic model---owners with mortgage				
Total	16.11(d)	24.94	9.17(c)	16.07
Age 25-34	17.21	23.41	11.76	16.65
Age 35-44	11.65	23.07	3.11	11.62
Age 45-54	18.95	25.31	17.36	21.46
Age 55-64	29.58	35.71	3.36	18.29
Age above 65	22.24	34.01	50.82	43.74
Case VI: Basic model---renters				
Total	26.88(c)	32.60	20.78(a)	24.68
Age 25-34	26.77	29.32	20.93	24.06
Age 35-44	22.99	27.96	17.55	20.66
Age 45-54	31.88	38.84	25.51	30.61
Age 55-64	37.25	42.59	25.38	30.44

Age above 65	25-40	47-85	21-66	26-21
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Notes: (a) Actual saving rate.

(b) Estimated saving rate, net mortgage payment is excluded neither in disposable income, nor in saving.

(c) Estimated saving rate, net mortgage payment is included both in disposable income and in saving

(d) Actual saving rate, net mortgage payment is included both in disposable income and in saving.

As the upper panel of Table 8 shows, the saving rates of owners without mortgage would be lowered by 6 to 10% under the pressure of the mortgage burden [compare Case I (a) and Case II (b)]. Similarly, the saving rates for owners with mortgage would mark up by around 8% when the burden of mortgage is removed. It is worth to note, that this pattern exist consistently in age groups under age 54, but does not exist in older groups. For example, owners with mortgage at age 55-64 would have an actual saving rate of 22.84%, while its predicted saving rate after removing the mortgage burden is 22.68%. Homeowners over age 65 display a higher predicted saving rate (24.91%) when the mortgage burden is implemented than without (12.86%). A possible reason for the older age groups to have this deviated savings pattern from what was expected might be due to the small sample size (and therefore, the variation resulted from the uncontrolled characteristics) of households with mortgage. As denoted at the very right hand column, the number of observations for housing owners with mortgage is 219 for age 55-64, and is only 76 for age over 65 in comparison with other age groups with more than 1,000 observations.

As was noted above, the net mortgage payment is not included in the official definition for savings. Considering the add-back of the net mortgage payment in the household's savings, not only does it provide a more precise measurement for the household's saving rates, but also provide the comparing standard for the predicted saving rates under the revised savings levels.

The differentials of the predicted and the actual saving rates between households with and without mortgage payment imply that the "forced savings" is an essential item that households with mortgage should possess, in addition to their actual savings. And through the estimate of the forced savings, we can push one step further to understand the potentially underestimated savings of households with mortgage payment.

The bottom panel of Table 8 replicates the procedure of the upper panel with the adding up of the net loan payment into the disposable income and savings for households with mortgage. After the adjustment, the saving rates (either the average saving rates or the total saving rates) of households with mortgage payment will increase by 3 to 7%, while the differentials of the predicted and the actual saving rates reduce a little bit. Owners without mortgage would have a decreased saving rate by 3 to 7% under the pressure of the mortgage payment, while owners with mortgage would have an

increased saving rate by 5 to 8% when the pressure of the mortgage payment is removed. The older groups, which include age 55-64 and age over 65, again display an inconsistent pattern when compared with the younger groups.

Furthermore, it is obvious, that the estimated saving rates with the adjustment of the net mortgage payment are much closer to that of the corresponding groups than without. The horizontal differentials also denote that how close the saving rates of the two groups would be under the similar situation, i.e., the saving rates of households with loans would have been if mortgage were removed, or that of households without loans would have been if the mortgage payment were attached. As we compare section (a)s and (b)s in Case I through IV, further conditions are included. As an example, we focus on the age group 25-34. In Case I, the actual saving rate for housing owners without mortgage is 24.99%, and that the predicted saving rates for households with mortgage would have had if without the mortgage payment is 19.52%. In Case II, the actual saving rate for households without mortgage is 9.44%, and the corresponding predicted saving rate is 14.59%. In comparing the bottom panel with the net mortgage adding back into savings of households with loans, section (c) of Case III shows the predicted saving rates has marked up to be 23.57% in correspondence to 24.99% for the actual savings without mortgage payments. And in Case IV, the actual saving rate is 17.21% and the predicted, 18.66%. It is clear that the predicted saving rates are very closer to the actual rates for the corresponding groups in both Cases at the bottom panel than that at the upper panel (except for the older age groups). And from the above results, we can conclude that forced savings for households with mortgage payment are around 3 to 9% at various stages over the life cycle.

It is worth to note, that the elder households with mortgage show a totally different pattern from the younger households. As section (a) of Case I shows, the saving rates for the former group is as low as 20.10% for age 35-44 due to the heavy burden of child raising in comparison with around 24% for other age groups. However, owners without mortgage for age over 65 show the lowest saving rate among all the other younger age groups, which is 12.86% only. In contrast, the pattern of the saving rates for households with mortgage payment is different. As section (a) in Case II shows, the saving rate is lower for younger age groups, which is 9.44% for age group 25-34, 8.10% for age group 35-44 and 12.36% for age group 45-54. And when comparing the young households with and without mortgage at the same age range, it is clear that mortgage will obviously dampen the saving rates for the young households. Younger households without mortgage will have a saving rate of at least over 20% whereas it is only around 10% for those with mortgage.

This pattern does not hold for the older age groups. The actual saving rates for household with mortgage for age group 55-64 is 22.84%, which is only about 1.5% less than the 24.15% saving rates for the same age group without mortgage. For the group of age over 65, the saving rate for these two types of households is almost the same, which is around 12.5%. If the net mortgage payment is counted as savings plus the disposable income of households with mortgage, the saving rates for age groups 25-34 and 45-55 will run up by about 7% (from 9.44 to 17.21%, and 12.36 to 18.95%), while the saving rate for the age group 35-44 will increase by 3.5% (from 8.10 to 11.65%) only. As for the older households, the saving rates are 29.54 and 22.24% for age group 55-64 and for age over 65, respectively. These rates are much higher than households without mortgage, and it implies that the housing mortgage is a heavy burden for the younger households. The younger households with mortgage burdens are of a weaker economic status in terms of the saving rates. But for the older households, the reverse is true. For households over age 55 and are still paying for mortgage, their saving rates are about the same as those without mortgage. And if the net mortgage payment is included as part of savings, households with mortgage will have a much higher saving rate (5% more for age 55-64, and 10% more for age over 65) than households without it.

In Table 9, we introduce renters into the estimation of the saving function with two types of housing owners. The upper panel shows the estimated saving functions between households without loans and renters. The middle panel is the estimated saving functions between households with mortgage and renters. The bottom panel is the replicates of the middle panel with the net mortgage payment included in the disposable income and savings. In the upper panel, it shows that the actual saving rates for households without loans (section (a) in Case I) are lower than that for renters (section (a) in Case II) of the younger households under age 44 while the reverse is true for households over age 45. Especially for the group of age over 65, renters have a 9% higher saving rates than housing owners without mortgage. And based on the saving function of renters, the predicted saving rates for owners without loans are 2 to 10% higher than if mortgage were attached (see section (b) in Case II). On the other hand, renters will have 5 to 20% lower saving rates if they were to possess their own houses without mortgage. In particular, for older households over age 55, the saving rates will drop from over 21% to less than 6%. It seems that renters have a much higher saving propensity than households without loans. The estimated forced savings for renters in contrast to households without loans are between 2 to 20%, and the older households have larger savings differentials than young households. Obviously, renters tend to save more in order to own a housing unit.

The middle and the bottom panels are the estimated savings between renters and owners with mortgage before and after the savings adjustment. The actual saving rates for renters (section (a) in Case IV) are higher than the mortgage owners (section (a) in Case III). For instance, saving rates for renters of age 25-34 is 20.93%, when compared with the 9.44% for households without loans of the same age range. And for age group 55-64, saving rates are similar between renters (25.38%) and households without loans (22.84%). If the net mortgage payment were added into savings of households with loans (section (d) in Case V), the saving rates would be similar to that of renters. And for the older households, households with loans have higher saving rates than that for renters, such as households of age 55-64, the saving rate for households with loans is 29.58% while for renters, 25.38%. As for households of age over 65, the average saving rate for households with loans is 22.24% and that for renters' is 21.66%.

For the predicted saving rates, if owners with mortgage behave like renters, their saving rates will increase by 10 to 15% (section (b) in Case III). It implies, that if owners with mortgage were treated as renters, they would save more than 20%, while some age groups save even up to 34% (i.e. age group 55-64). After adjusting the net mortgage payment as part of the disposable income and savings, the saving rates for owners who behave like renters will increase by about 2% or more than those that are not adjusted (section (c) in Case IV). As an example, age group 55-64 would have saved 37%.

The predicted saving functions are fairly consistent and that households with loans would possess higher saving rates if they were renters, however, the reverse is not quite stable. As section (b) in Case III and section (c) in Case V suggest, renters will have much lower saving rates if they had already owned a house with loan payments. However, the predicted saving rates for renters are not stable, and the example is, that for age groups 35-44 and 55-64, they both display negative predicted saving rates if they had owned houses with loans. If the net mortgage payment is incorporated into the disposable income and savings, the predicted saving rates will increase by around 3 to 5%. The other extraordinary age group is the age group over age 65, with its predicted saving rate over 40%, and it even goes up to 50% while the above Cases of the age group over 65 tend to have lower saving rates in comparison. The instability and asymmetry of the predicted saving rates between renters and households with loans require further analysis. An possible explanation is that the saving function of these two types of households are not the same, or that the variation of the household's characteristics are not well controlled by our model specification.

Conclusion

A common puzzling phenomenon over the household survey of Taiwan is that the renters' saving rate is higher than that of owners', whereas the latter have a higher average income than the former. One reason for this situation is that certain owners have to pay a great amount of mortgage payment that is not included in savings, and not included in the disposable income, either.

On the other hand, the saving decision is correlated with the tenure choice, while the tenure choice is also correlated with the household's life cycle, in addition to income, since the family size varies in different stages of the life cycle. Therefore, to estimate the correct saving rate, the consideration of the tenure decision over the life cycle is necessary.

In this study, we firstly estimated the saving rate in a traditional way, and then we estimated the saving rate after the adjustment of the mortgage payment. In order to figure out the correct saving rate with the tenure decision, we also evaluated different household's saving behaviors according to different cohorts, just so that we could check how life cycle plays its role in this study. Finally, we assessed the bias of the traditional definition of saving rates for different cohorts.

Applying the household survey of Taiwan at the year of 1996, we found that the mortgage payment has a significant impact on household savings in general, both for owners with mortgage and for the renters. Furthermore, since the household's characteristics usually have a significant effect on determining the household's saving rate, we estimated the average saving rate and the total saving rate by using the estimated saving functions for different types of household groups. We found that the estimated saving rates for owners without mortgage and for owners with mortgage are very close to each other, while the original saving rate is totally different. From the above results, we can conclude that forced savings are prevalent for households with loans and for renters. Younger households tend to have higher forced savings, i.e., the gap of savings between households with and without housing (or with and without loans) is larger for younger households. Younger households are subject to heavier burden for housing purchase, which is an implication showing that the incomplete capital market could prevent the younger households from financing the need on housing purchase. Age 55 seems to be a threshold, and households under age 54 tend to have positive forced savings under the burden of mortgage. Households above age 55 tend to have negative forced savings. Positive forced savings for younger households implies that they have to sacrifice a substantial portion of savings for mortgage payment, which will reduce the younger households' abilities to deal with risks. The policy implication is to improve the efficiency of the credit market and the length of the mortgage terms, which will consequently reduce the burden of mortgage and forced savings as well. For households over age 65, forced savings is negative,

which implies that there is an over-saving for households with mortgage. Therefore, it is clear that the younger households and the older households are facing different economic situations, and financial policies shall pay attention to the release of the mortgage pressure on households' consumption and savings.

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Appendix A: The Definition of Variables

DISPY: household disposable income

DISPY2: squares of disposable income

SAVE: total amount of saving

DISPYM: disposable income plus net mortgage payment

DISPYM2: squares of DISPYM

SAVEM: total amount of saving plus net mortgage payment

HD_SEX: if the household head is male, then HD_SEX=1; else, HD_SEX=0

HD_AGE: the age of household head's age

HD_AGESQ: squares of HD_AGE

HD_GRAD: if the household head is graduate, then HD_GRAD=1; else,
HD_GRAD=0

HD_PUB: if the household head is working at a public agency, then
HD_PUB=1; else, HD_PUB=0

HD_EMP: if the household head is currently employed, then HD_EMP=1;
else, HD_EMP=0

M_EDELEM: if the male head is graduated from elementary school, then
M_EDELEM=1; else, M_EDELEM=0

M_EDJRHI: if the male head is graduated from junior high school, then
M_EDJRHI=1; else, M_EDJRHI=0

M_EDHIGH: if the male head is graduated from senior high school, then
M_EDHIGH=1; else, M_EDHIGH=0

M_EDCOLL: if the male head is graduated from college, then M_EDCOLL=1;
else, M_EDCOLL=0

(The reference group is that the male head is illiterate.)

F_EDELEM: if the female head is graduated from elementary school, then
F_EDELEM=1; else, F_EDELEM=0

F_EDJRHI: if the female head is graduated from junior high school, then
F_EDJRHI=1; else, F_EDJRHI=0

F_EDHIGH: if the female head is graduated from senior high school, then
F_EDHIGH=1; else, F_EDHIGH=0

F_EDCOLL: if the female head is graduated from college, then F_EDCOLL=1;
else, F_EDCOLL=0

(The reference group is that the female head is illiterate.)

N_0004: number of persons under four years of age

N_0509: number of persons between five and nine years of age

N_1014: number of persons between ten and fourteen years of age

N_1519: number of persons between fifteen and nineteen years of age

N_2024: number of persons between twenty and twenty-four years of age

N_2534: number of persons between twenty-five and thirty-four years of age

N_3544: number of persons between thirty-five and forty-four years of age

N_4554: number of persons between forty-five and fifty-five years of age

N_5564: number of persons between fifty-five and sixty-four years of age

TOT_ERNR: total number of earners in a household

LNSIZE: log of total number of persons in a household

URBAN: if the sample is from urban, then URBAN=1; else URBAN=0

SUBURBAN: if the sample is from suburban, then SUBURBAN=1; else,
SUBURBAN=0 (The reference group is rural area)

SP_EXIST: if spouse exists then SP_EXIST=1; else SP_EXIST=0

TAIPEI: if the sample is from Taipei, then TAIPEI=1; else TAIPEI=0

TAICHONG: if the sample is from Taichong, then TAICHONG=1; else,
TAICHONG=0

KOUSHONG: if the sample is from Koushong, then KOUSHONG=1; else,
KOUSHONG=0 (The reference group is other areas of Taiwan.)

ONE: if the housing unit is in the floor, then ONE=1; else ONE=0

TWTHRE: if the housing unit is in second or third floor, then TWTHRE=1;
else, TWTHRE=0

FOFIV: if the housing unit is in fourth or fifth floor, then FOFIV=1; else,
FOFIV=0 (The reference group is the housing units above six floors.)

W_INDEP: if the wall of a housing unit is independent to other buildings,
then W_INDEP=1; else, W_INDEP=0

Appendix B - Estimated Saving Functions

Table B.1 : Estimated Saving Functions for Owners without Mortgage

	Total		Age 25-34		Age 35-44		Age 45-54		Age 55-64		Age above 65	
	coefficient	t-value	coefficient	t-value	coefficient	t-value	coefficient	t-value	coefficient	t-value	coefficient	t-value
INTERCEP	35310	0.94	-285468	-0.47	615054	-0.47	753971	0.72	0.5016**	0.44	2370884	0.80
DISPY	2.15	0.4781**	0.4091**	13.26	0.2882	**	13.50	0.5016**	23.37	0.5770**	16.62	0.3988**
	16.30	19.78	7.87E+08**	9.80	9.00E+08**	18.28	2.56E+08**	7.66	2.87E+08**	3.17	6.40E+08**	13.51
DISPY2	4.17E+08**	1.58	-27771	-0.84	-2138.90	-0.12	36215*	1.84	5498.38	0.25	23821*	1.76
HD_SEX	14088	-1.84	20504	0.50	-27299	-0.63	-35697	-0.51	-81089	-0.82	-14388	-0.82
HD_AGE	-2429*	-0.84	-338.11	-0.50	355.48	0.65	372.90	0.53	673.82	0.81	99.75	0.81
HD_AGE2	17.50	0.87	-22039*	-1.91	-36584	**	-4.51	-7924.00	-0.87	-24404	-1.93	-308593**
HD_PUB	-24923**	-5.29	-8686.37	-0.20	-23039	-0.94	-40410	-1.60	-30448	-1.37	-13002	-1.37
M_EDELEM	-20813**	-2.05	12855	0.35	-25729	-1.04	-44749	-1.64	-48728*	-1.67	1253.73	-1.67
M_EDJRH	-24498**	-2.24	-5843.62	-0.16	-42647	*	-1.77	-41972	-1.57	-28721	-0.98	-38397**
M_EDHIGH	-35777**	-3.34	-15078	-0.41	-63379	**	-2.56	-52636*	-1.85	-80906**	-2.31	5072.35
M_EDCOLL	-53615**	-4.74	-64858**	-2.48	-33780	**	-2.04	1102.88	0.06	10875	0.73	-22.66
F_EDELEM	-3136	-0.46	24089	1.36	-14903	-0.89	-60895**	-2.65	-10607	-0.37	8144.85	-0.37
F_EDJRH	-16320*	-1.93	-60228**	-4.18	-41786	**	-2.59	-55030**	-2.39	-21444	-0.63	-34121
F_EDHIGH	-40562**	-5.15	-78540**	-4.33	-34658	*	-1.79	-57285**	-2.04	-46478	-1.17	-67630**
F_EDCOLL	-54356**	-5.36	24667**	2.58	-3883	-0.36	18823	0.75	34304*	1.78	24169	1.07
N_0004	14464**	2.47	9626	1.02	-6784	-0.74	118.93	0.01	12067	0.60	49892**	0.60
N_0509	5534.42	1.11	23020	1.52	-16049	-1.87	22068	1.60	15191	0.66	16511	0.66
N_1014	4096	0.89	-29936	-1.42	-37594	**	-4.32	-6123.52	-0.58	-30431	-1.62	-13003
N_1519	-21670**	-5.24	0.90	0.74	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
N_2024	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

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Table B.2 Estimated Saving Functions for Owners with Mortgage

	Total		Age 25-34		Age 35-44		Age 45-54		Age 55-64		Age above 65	
	coefficient	t-value	coefficient	t-value	coefficient	t-value	coefficient	t-value	coefficient	t-value	coefficient	t-value
INTERCEP	161002*	1.67	-1402127	-1.24	1447915	0.90	2051738	0.58	4947879	0.59	4757934	0.87
DISPY	5.0996**	19.84	0.2659**	3.83	0.7016**	18.19	0.3230**	4.83	0.3646**	4.55	0.8030**	6.11
DISPY2	4.37E+10	0.07	9.32E-08**	3.68	-7.02E-08**	-7.71	5.33E-08**	3.00	8.75E-08**	5.65	-1.67E-08	-0.66
HD_SEX	38741*	1.84	57389	1.15	16671	0.48	41604	1.02	-1236.57	-0.02	83454	0.69
HD_AGE	-6854*	-1.73	98355	1.31	-81174	-0.99	-80700	-0.56	-147955	-0.52	-153606	-1.02
HD_AGESQ	83.968**	1.98	-1625.92	-1.30	1083.22	1.05	824.61	0.56	1156.10	0.49	1092.38	1.06
HD_PUB	-39974**	-4.58	-48219**	-2.77	-31794**	-2.42	-44281**	-2.34	-6578.83	-0.24	128687	0.91
M_EDELEM	-70244**	-2.40	-114454	-1.46	-90951	-1.78	-82931	-1.40	8825.65	0.12	-10965	-0.09
M_EDRHI	77634**	2.65	-73432	-1.16	-90101	-1.79	-73829	-1.16	-49251	-0.64	-8514.98	-0.06
M_EDHIGH	-79378**	-2.88	-88531	-1.47	-72791	-1.51	-115892**	-1.98	13606	0.18	-84830	-0.67
M_EDCOLL	-84588**	-3.03	-97121	-1.62	-78853	-1.59	-122529**	-2.12	-6291.17	-0.08	-11761	-0.09
F_EDELEM	-15818	-0.81	-50779	-0.95	-51396	-1.41	-39017	-0.86	49069	1.06	6308.40	0.08
F_EDRHI	-51714**	-2.63	-3153.74	-0.09	-108733**	-3.08	-34615	-0.68	-118571*	-1.82	-42634	-0.38
F_EDHIGH	-69762**	-3.81	-41742	-1.44	-113982**	-3.43	-74732	-1.48	-158408**	-2.07	-99981	-0.67
F_EDCOLL	-106792**	-5.13	-78932**	-2.49	-159031**	-4.32	-88149	-1.54	-54808	-0.67	-218514	-1.33
N_0004	-5837.99	0.46	-7151.10	-0.39	-31896	-1.28	-13671	-0.29	-49624	-0.98	159699	1.39
N_0509	-856.97	-0.08	-3190.69	-0.17	-22151	-1.05	-8179.84	-0.24	-95201	-1.53	-2074.24	-0.02
N_1014	-9698.71	-0.94	245.75	0.01	-29689	-1.44	-26822	-0.96	-41109	-0.70	131291	1.59
N_1519	-42989**	-4.37	-76248**	-1.99	-84677**	-4.04	-14695	-0.66	-34983	-0.90	372.36	0.00
N_2024	-26600**	-2.29	-3782.87	-0.15	28077	0.77	-29165	-1.27	-23000	-0.81	-26538	-0.32
N_65UP	-214*	-1.68	-19413	-0.71	-49529**	-1.98	-31643	-1.03	-10742	-0.20	-66251	-1.13
TOT_ERNR	4049**	5.25	70982	4.73	28824	2.16	60865**	4.06	-15396	-0.69	52911	0.85
HHSIZE	-28587**	-3.76	-35186	-3.01	-3905.08	-0.23	-30265	-1.46	-15780	-0.69	-102677**	-2.02
URBAN	-78875**	-3.29	-36348	-0.89	-73244**	-1.92	-55321	-1.02	-249683	-3.05	48667	0.43
SUBURBAN	-53258**	-2.23	-36016	-0.91	-37235	-0.98	-23899	-0.43	-317805	-3.72	123830	1.06
TAIPEI	-44088**	-3.15	-35889	-1.25	-64927**	-2.99	11201	0.39	-128700	-2.68	-57371	-0.72
TAICHONG	17116	0.74	33097	0.96	49054	1.28	76531	1.2	-44878	-0.63	39609	0.18
KOUSHONG	-10398	-0.81	-11202	-0.45	-2107.00	-0.11	-9995.99	-0.37	-51913	-1.26	10398	0.13
ONE	48370	1.29	45330	0.60	55718	0.93	112931	1.40	-241450	-2.30	243495	1.44
TWTHRE	42471**	3.22	46171	2.13	40381	1.97	43776	1.43	7054.11	0.14	92220	1.00
FOFV	35487**	2.92	38445	1.84	25495	1.40	41635	1.47	33265	0.69	113206	1.49
Adjusted R ²	0.5084		0.4592		0.4499		0.4840		0.8060		0.8702	
F-value	111.649**		23.130**		39.571**		23.383**		17.759**		17.759**	
No. of Obs.	3210		782		1415		716		218		75	

Note: See Table B.1.

Table B.3 Estimated Saving Functions for Owners with Mortgage: Forced Saving

Total	Age 25-34		Age 35-44		Age 45-54		Age 55-64		Age above 65				
	coefficient	t-value	coefficient	t-value	coefficient	t-value	coefficient	t-value	coefficient	t-value			
INTERCEP	209021**	2.13	-1640373	-1.42	1321631	1.42	1530400	0.42	3511928	0.42	4001868	0.73	
DISPY	0.6038**	25.53	0.2624**	4.48	0.7161**	6.47	0.80	0.3676**	4.56	0.8186**	6.36		
DISPY2	-6.41E-09	-1.26	-4.43E-08**	6.82	-4.43E-08**	-6.48	4.39E-08**	21.08	4.39E-08**	21.08	4.39E-08**	-0.78	
HD_SEX	25457	1.18	62617	1.23	4454.36	0.12	12235	0.29	5321	0.08	107382	0.88	
HD_AGE	-848**	-2.11	117549	1.53	71435	-0.85	-58502	-0.40	-100629	-0.36	-133539	0.88	
HD_AGESQ	94.82**	2.19	-1940.67	-1.52	928.99	0.87	588.18	0.39	775.08	0.33	949.40	0.91	
HD_PUB	-32471**	-3.65	-49119**	-2.76	-26878**	-1.99	-34098*	-1.76	-7319	-0.27	139346	0.99	
M_EDELEM	-61105**	-2.05	116558	-1.45	-65494	-1.25	-62461	-1.03	21274	0.30	-30774	-0.24	
M_EDRHI	-72867**	-2.44	-79188	-1.22	-67469	-1.30	-60628	-0.93	-45012	-0.58	-34583	-0.25	
M_EDHIGH	-77262**	-2.75	-93915	-1.53	-53503	-1.08	-95514	-1.59	24753	0.33	-111331	-0.88	
M_EDCOLL	-93229**	-3.28	-115113*	-1.88	-65424	-1.29	-110007*	-1.85	1346	0.02	-39626	-0.30	
F_EDELEM	-13361	-0.67	-43520	-0.80	-98208**	-3.8399	-1.03	-23803	-0.51	42694	0.92	4706	0.06
F_EDJRHI	-54044**	-2.69	3638	0.10	-98208**	-2.70	-32731	-0.63	-133251**	-2.05	-35433	-0.31	
F_EDHIGH	-75337**	-4.04	-40836	0.17	-106546**	3.12	-81936	-1.59	-163460**	-2.14	-95412	-0.64	
F_EDCOLL	-123841**	-5.86	-87014**	-2.70	-170705**	-4.52	-101358*	-1.73	-70593	-0.87	-216582	-1.32	
N_0004	1730.35	0.13	-8969	-0.48	-21475	-0.84	-8306	-0.17	-33981	-0.67	178647	1.53	
N_0509	1926.04	0.18	-7788	-0.40	-19602	-0.91	-9613	-0.27	-80402	-1.29	-5531	-0.05	
N_1014	-3215.68	-0.30	-9597	-0.31	-21659	-1.02	-25718	-0.90	-31932	-0.55	127227	1.53	
N_1519	-38055**	-3.80	-79947**	-2.04	-77787**	-3.61	-10182	-0.44	-31228	-0.80	1211	0.01	
N_2024	-24932**	-2.11	13082	0.51	17271	0.46	0.46	0.46	-31805	-1.35	-21272	-0.75	
N_65UP	-16047	-1.23	-28854	-1.04	-39604	-1.54	-32121	-1.02	-10295	-0.19	-52133	-0.90	
TOT_ERNR	27566**	2.69	3.55	55121	**	3.66	24041*	1.77	43795**	2.89	-14512	-0.65	
HHSZE	-38525**	-4.99	-35283**	-2.95	-18642	-1.05	-36676*	-1.73	-22046	-0.97	-106481**	-2.10	
URBAN	-79797**	-3.27	-32311	-0.77	-79476**	-2.03	-60585	-1.09	-238728**	-3.63	-309648**	-3.63	
SUBURBAN	-54238**	-2.22	-27041	-0.67	-43808	-1.12	-31290	-0.55	-309648**	-3.63	130236	1.11	
TAIPEI	-36240**	-2.52	-15769	-0.53	-57242**	-2.53	12718	0.43	-118075**	-2.45	-41939	-0.52	
TAICHONG	23126	0.98	33783	0.96	62713	1.59	1.59	1.59	-78146	-1.27	-30761	-0.43	
KOUSHONG	-14350	-1.10	-12994	-0.51	19636	1.01	-17178	-0.62	-48405	-1.18	2467.51	0.03	
ONE	61507	1.61	47117	0.61	75676	1.40	116335	1.40	-228603**	-2.18	265639	1.57	
TWTHRE	46948**	3.49	39770	*	1.79	55673**	2.65	46755	1.48	-397.95	-0.01	95776	1.03
EDEIV	32167**	3.00	-23495	-1.09	-63620*	1.93	-42867	1.65	36845	0.77	-113347	-1.49	
Adjusted R ²	0.5839		0.5490		0.5531		0.5531		0.8114		0.8707		
F-value	151.132**		37.079**		58.411**		30.534**		32.273**		17.830**		
No. of Obs.	3210		782		1415		716		218		75		

Note: See Table B.1.

Table B.4: Estimated Saving Functions for Renters

	Total		Age 25-34		Age 35-44		Age 45-54		Age 55-64		Age above 65	
	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value
INTERCEP	20700	0.28	1516015	1.20	-1126135	-0.93	2452346	0.86	-186896	-1.94	349862	0.22
DISPY	0.3482 **	8.60	0.5077 **	5.14	0.2884 **	4.98	0.2909 **	3.02	0.6172 **	3.06	0.3397 **	2.46
DISPY2	8.80E+08 **	5.21	-4.32E+08	-0.98	8.70E+08 **	3.53	1.6E+07 **	4.31	2.48E+08	0.26	2.13E+07 *	1.95
HD_SEX	15771	1.04	70418	1.43	-21914	-1.02	7413.10	0.21	1929.04	0.03	18575	0.77
HD_AGE	4612.21 *	1.78	-100900	-1.20	61791	1.01	-89809	-0.78	614188 *	1.90	-10298	-0.23
HD_AGESQ	-50.26 **	-1.87	1737.76	1.24	-780.28	-1.01	882.11	0.75	-5067.55 *	-1.87	62.88	0.21
HD_PUB	-41791 **	-3.50	-42963	-1.53	-10351	-1.03	-0.54	-60687 **	-2.63	-14604	-0.29	0
M_EDLEML	-16017	-0.90	-14301	-0.20	-14591	-0.49	13128	0.35	-35639	-0.63	-32866	* -1.66
M_EDIRHI	-1483	-0.08	-38192	-0.64	-1663.99	-0.05	-188.13	0.00	-58025	-0.62	26047	0.99
M_EDHIGH	-24041	-1.33	-61202	-1.09	-16218	-0.54	-25732	-0.62	33739	-0.63	63075	** -1.99
M_EDCOLL	-33888 *	-1.75	-48161	-0.86	-28791	-0.92	-57996	-1.28	-49135	-1.28	-47783	-1.64
F_EDLEML	-10842	-0.80	22413	0.51	-58564	**	-2.31	-4049.55	0.15	-41407	-0.85	-44629
F_EDIRHI	-19367	-1.34	18788	0.53	-63539	**	-2.56	-20413	-0.58	-120012	-1.00	-140490 **
F_EDHIGH	-44784	**	-3.28	-19459	-0.67	-88418	**	-3.57	-3817.25	-0.11	-225400 **	-1.99
F_EDCOLL	-69235	**	-3.51	-18419	-0.48	-115308 **	-3.35	1846.91	0.04	-164392	-1.08	0
N_0004	-7634	-0.70	-36074	-1.66	-28067	-1.42	51719	1.21	196525	1.44	16996	0.16
N_0509	-12966	-1.41	-36286	-1.82	-32913	-1.88	29288	0.88	-25795	-0.87	-21467	-0.30
N_1014	-13834	-1.57	-55530 *	-1.76	-35145	**	-2.11	10524	0.47	246619 **	2.16	9557.02
N_1519	-31934	**	-4.15	-38654	-1.18	-50555	**	-3.14	-18867	-1.16	10245	29036
N_2024	-9280	-0.93	-20343	-0.70	-58509	**	-2.54	19223	1.00	-20713	-0.54	-50330
N_65UP	11349	1.01	9047.36	0.32	-18498	-0.87	24741	0.95	72379	0.88	25238	0.95
TOT_LERNR	43358 **	6.51	31937 *	1.72	49968 **	4.67	46953 **	4.13	11668	0.40	32381	1.16
HHSIZE	-37109 **	-3.07	-17528	-1.26	-11205	-0.75	-58007 **	-3.80	-51630	-3.80	-58780	** -2.81
URBAN	-30463	-1.41	-64031	-1.04	-41775	-1.37	-39476	-0.84	55969	0.59	37342	1.10
SUBURBAN	-19728	-0.89	-74575	-1.21	-26292	-0.84	-18524	-0.37	65183	0.60	44436	1.24
TAIPEI	-55778 **	-5.09	-46763	-1.64	-55855	**	-3.48	-52989 **	-2.27	-87957	-1.62	-31336
TAICHONG	-35077 **	-1.98	-65542	-1.60	-17572	-0.73	-30636	-0.58	-10246	-0.58	-0.09	-23671
KOUSHONG	-11506	-1.16	-36866	-1.41	12810	0.89	-44120 **	-2.18	13685	0.29	32254	1.52
ONE	49148 **	3.12	24627	0.66	44723 *	1.90	76382 **	2.02	158005 *	1.87	22090	0.67
TWTHRE	52919 **	3.96	64158 **	2.27	24302	1.21	69543 **	2.22	135495	1.64	19756	0.57
FOFV	27743 **	2.21	22163	0.86	19611	1.03	54547 *	1.82	81428	1.13	7121.20	0.22
Adjusted R ²	0.6234	0.4294	0.6117	0.4236	0.4234	0.4234	0.4234	0.4234	0.4234	0.4234	0.4234	0.4234
F-value	82.991 **	10.087 **	27.359 **	7.583 **	39.397 **	10.677 **	65	65	65	65	65	65
No. of Obs.	1193	296	502	257	257	257	257	257	257	257	257	257

Note: See Table B.1.