

# Hong Kong Mortgage Default Model

**Hong Kong**

Chris Chau  
 852 2522-9581  
 cchau@fitchibca.com

**New York**

Jill M. Zelter  
 (212) 908-0774  
 jzelter@fitchibca.com

C. Mia Koo  
 (212) 908-0651  
 mkoo@fitchibca.com

**Sovereign**

Gabriel Torres  
 (212) 908-0705  
 gtorres@fitchibca.com

## Collateral Information Checklist

### Loan Attributes

- Loan balances (current and original).
- Property appraisals (original and current).
- Origination and paid-through date.
- Loan type (fixed versus variable tenor).
- Loan term (original, remaining, and seasoning).
- Loan purpose.
- Loan status (if in arrears, number of months and balance).

### Borrower Attributes

- Profile (e.g. first-time homebuyer).
- Status (e.g. self-employed).
- Debt-to-income ratio (original and current).

### Housing Attributes

- Class type (A, B, C, D, or E).
- Home type.
- Owner-occupied or investment property.
- Regional dispersion.
- Duration of lease.
- Age of property.

### Pool Concentration

- Geographic location (by region).
- Building, development, and insurance provider.

mortgage loans (MBS). The model, developed from an analysis of approximately 20 years of historical residential home market value data, calculates credit enhancement requirements to support ratings on investment-grade classes of MBS. The past 20 years of data include several stressful periods in Hong Kong, such as the 1989 Tiananmen Square student protest and the 1994–1995 rise in domestic interest rates of the People’s Republic of China (PRC). The model incorporates a loan-by-loan analysis that takes into account the characteristics of each individual property, borrower, and loan.

To determine rating guidelines that reflect the unique characteristics of mortgages and lending practices in the Hong Kong market, Fitch IBCA conducted a study of the residential mortgage market. The study included an examination of the residential mortgage portfolio from several leading originators of Hong Kong residential mortgages. In addition, Fitch IBCA analysed data and research obtained from the Rating and Valuation Department of the HKSAR government (HKRV), Census and Statistics Department of the HKSAR government (HKCS), and the Hong Kong Monetary Authority (HKMA).

Fitch IBCA’s Hong Kong mortgage default model calculates credit losses for MBS based on the probability of borrower default and loss severity. The model focuses on the interaction of three factors that serve as the primary determinants of default:

- The financial resilience of a borrower as evidenced by the debt-to-income ratio (DTI).
- Effects of an unexpected downturn in the borrower’s financial standing, such as unemployment or divorce.
- The amount of equity the borrower has invested in the home (or loan-to-value ratio [LTV]).

## ■ Summary

Fitch IBCA has developed a new model for evaluating credit loss levels on securities backed by Hong Kong Special Administrative Region (HKSAR) residential

Loss severity is determined by considering regional market value trends, the costs involved once a borrower has defaulted (carrying costs and legal expenses, among others), and LTV. Fitch IBCA's market value assumptions are based not only on traditional determinants but also on historical home price volatility by region, home classification (class A, B, C, D, or E), and projected steady sustainable growth. The estimation of costs used in Fitch IBCA's model are representative of actual cost data supplied to Fitch IBCA by Hong Kong residential mortgage originators.

### ■ Sovereign Ceiling

Fitch IBCA rates the HKSAR's foreign currency obligations 'A+' and local currency obligations 'AA+', reflecting the region's extremely solid fiscal and macroeconomic position while acknowledging the political uncertainties resulting from its return to Chinese sovereignty (*see Fitch IBCA 1998 Research on "Hong Kong Special Administrative Region"*).

Country risk can enter the ratings equation in several ways. The general economic and business environment, which can determine underlying creditworthi-

ness, is directly affected by government macroeconomic policies. In addition, changes in relevant legislation may affect an issuer's debt-paying capacity.

More importantly, country risk affects ratings by limiting them to the "sovereign ceiling." The government's foreign currency rating normally acts as a ceiling for resident issuers, since there is ample empirical evidence that countries, when in a default situation, have imposed exchange controls and other measures that precluded otherwise creditworthy issuers from servicing their foreign currency debt. The local currency rating, on the other hand, is not usually a cap, as governments have few incentives to limit access to their own currency. Fitch IBCA will rate Hong Kong dollar transactions as high as 'AAA' given the appropriate structure.

Breaching the foreign currency ceiling requires structural provisions that isolate relevant cash flows from any government interventions. These include, but are not limited to, offshore reserve accounts, currency swaps, and alternative mechanisms to access foreign currency. Offshore reserve accounts will allow a deal to continue to be serviced

even in the event of foreign exchange controls. Currency swaps, if set up correctly, can take care of transfer and convertibility risk by having an appropriately rated swap counterparty pay foreign currency abroad as long as Hong Kong dollars are paid in a local account. When assessing different factors that can diminish sovereign risk, even if no single factor by itself is enough to eliminate it, Fitch IBCA takes a probability approach combining all relevant aspects. This process allows for two or more mitigating factors to be used to breach the foreign currency ceiling, even if none of them by itself would be enough. Fitch IBCA utilised this approach to rate an Argentine mortgage-backed securities deal two notches above Argentina's sovereign rating (*see Fitch IBCA Research on "BHN III Mortgage Trust, Series 1997-2," dated Nov. 3, 1997*).

### ■ Hong Kong Mortgage Market

The individual characteristics of the Hong Kong economy and legal system, as well as those of the Hong Kong mortgage market, played an important role in the development of Fitch IBCA's mortgage model and the assumptions behind it, as each factor influences borrower, loan, and property behaviour.

## Comparison of the 1994 and 1997 Hong Kong Monetary Authority Survey Findings

	September 1994	September 1997
Average Outstanding Amount (HK\$ Mil.)	0.8	1.3
Outstanding Loan-to-Value Ratio (%)*	53.3	52.0
Properties < 10 Years Old	68.2	56.4
Contractual Life (Months)	183	221
Seasoning (Months)	23	19
Remaining Contractual Life (Months)	160	202
Owner Occupied (%)	97.0	92.9
Interest Payment Method (%)		
Floating-Rate	96.0	92.0
Fixed-Rate	—	0.1
Staff Mortgages/Hybrid Interest Rates	—	7.9
Spread of Floating-Rate Mortgages over BLR (bps)**	129 (Average)	59 (Average)
Delinquency Ratio (%)		
> 60 Days	0.43	0.20
> 90 Days	0.13	0.10

\*Valuation refers to appraisal value at origination or refinancing. \*\*Hong Kong Prime rate. BLR – Best lending rate.

## Home Price Declines

The periods in which home prices declined include:

1. In 1984, confidence in the Hong Kong government eroded due to the signing of the Sino-British Joint Declaration governing the return of the colony to People's Republic of China (PRC) rule.
2. In 1989, the Tiananmen Square student uprising prompted the most recent exodus of Hong Kong residents to Canada, Australia, and the US
3. In 1994, a series of interest rate hikes and austerity measures within the PRC negatively affected the financial, manufacturing, and export sectors of the Hong Kong economy.
4. Most recently, the 1997 Asian currency crisis caused significant declines in home prices in Hong Kong as well as throughout the region.

The Hong Kong market currently has approximately Hong Kong dollar (HK\$) 493 billion residential mortgage loans outstanding. Virtually all housing in Hong Kong is in the form of mass residential condominiums; detached houses are affordable to only the extremely wealthy. Demand for private homes in Hong Kong has been strong. More than 911,000 private flats have been built as of 1997, while vacancy rates have averaged only 4.6% for the past 15 years. Although Hong Kong currently has a relatively low penetration of home ownership (only 45.2% by 1995) the private housing market is expected to continue its long-term growth. One factor for the future growth of the mortgage market is that the new HKSAR government has targeted 70% home ownership by 2007.

In the past, the residential housing market has grown steadily, except during certain periods of external political and economic stress (*see box above*). Fitch IBCA's analysis indicates that the most important underpinning to the rise in market value of Hong Kong residential housing is that there is a limited supply of housing for one of the most densely populated areas in the world (approximately 6.5 million people). This imbalance of demand and supply has driven prices for a class A flat from

HK\$3,800/square meter (m<sup>2</sup>) in 1977 to HK\$44,800/m<sup>2</sup> in 1996.

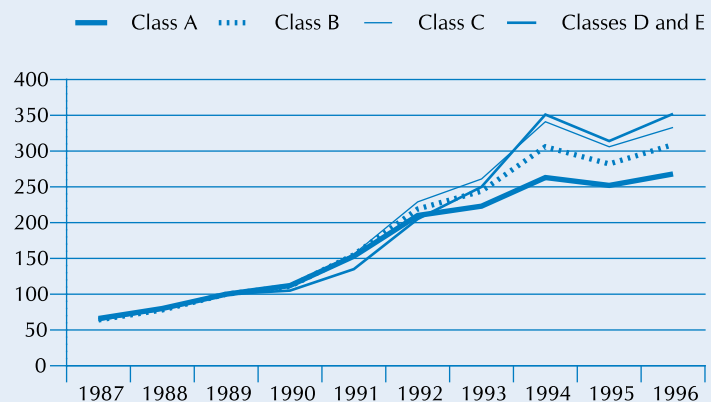
Fitch IBCA has also considered the unique social, economic, and cultural features of the local borrowers in the development of the model. As a result of this analysis, Fitch IBCA has concluded that the risk of borrower default is lower in Hong Kong than in other markets, such as the UK and US. Reasons for lower probability of default include:

- > Hong Kong has the world's fourth highest gross domestic product (GDP) per capita at US\$26,000,

compared US\$27,000 for the US and US\$23,000 for the UK.

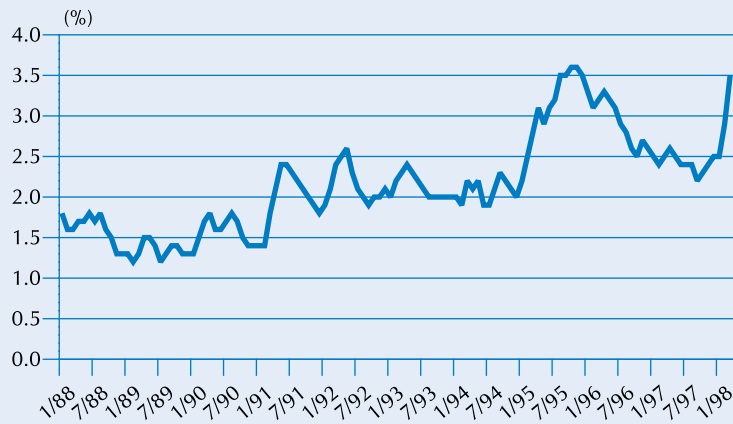
- > In general, Hong Kong residents take on lower levels of consumer debt by European and US standards. Credit cards are used to a greater extent now, but balances are paid relatively quickly, such that the card functions more like a debit card. For a majority of households, a mortgage is the only major form of debt. Overall, lower debt leads to a lower DTI ratio, which is a primary indicator of default.
- > There are very low levels of bankruptcy in Hong Kong, both personal and corporate. Low numbers of bankruptcy limit the probability of defaults, as well as the severity of loss should a default occur.
- > Most households have at least two wage earners contributing to the mortgage payment. Only 15% of all flats are occupied by one person.
- > Hong Kong has one of the highest savings rates in the world, at 33% of GDP. Given the high mortgage down-payment of at least 30%, it would be unlikely that the mortgagor would not use all his savings to retain the equity he has built up in the flat.

## Home Price Indexes



Note: 1989 = 100. Source: Hong Kong Monetary Authority Survey.

### Unemployment Rate



- As a result of Chinese cultural influence, a significant social status is attached to home ownership in Hong Kong. Property is also seen as the principal source of long-term investment for many Hong Kong residents.
- The divorce rate in Hong Kong, like the rest of Asia, continues to be low. Only 1.3% of the total population is divorced. Divorce is typically one of the primary causes of borrower default.
- Unemployment is extremely low in Hong Kong, averaging only 2.58% for the past 15 years. This is a function of free market economics, as opposed to “lifetime employment” found in other Asian economies. Hong Kong has very little in the

- form of government-sponsored social subsidies.
- Hong Kong has a free market-oriented tax structure, whereby the maximum personal income tax rate is 15%. Only 2% of Hong Kong residents have to pay this maximum level. Capital gains on stock and real estate transactions are not taxed. Additionally, to promote home ownership, a mortgage interest deduction of HK\$100,000 is allowed. This tax structure results in higher disposable income for savings and debt servicing.

Fitch IBCA has reflected the lower likelihood of borrower default in its default probability matrix as shown in the table below.

## Guidelines and Model Development

### Model Approach

To determine loss coverage for residential MBS, Fitch IBCA’s Hong Kong default model employs a loan-by-loan review, examining numerous loan-, borrower-, and property-specific factors that influence default probability and loss severity. Fitch IBCA’s base default probability analysis focuses primarily on the borrower’s DTI ratio, in conjunction with the loan’s LTV. These expected default rates then are adjusted further by loan, borrower, and property attributes.

A large component of Fitch IBCA’s recovery value analysis is market value trends. (Recovery value is the inverse of loss severity.) Fitch IBCA’s market value assumptions focus on historical declines, regional volatility, and sustainable growth. The base market value projections then are adjusted by loan and property attributes, including property size and ownership status. Fitch IBCA’s Hong Kong mortgage default model can be characterised as a worst-case, loss-driven model, which calculates investment-grade credit enhancement requirements for residential mortgage securitisations.

### Default Probability

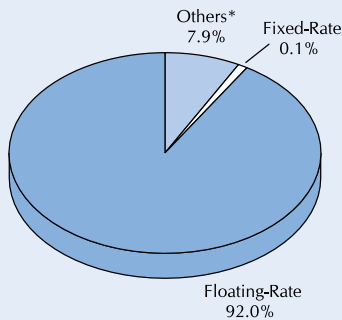
**Determinants of Default:** Fitch IBCA believes the primary indicators of de-

### ‘AAA’ Default Matrix

(%)

Loan-to-Value Ratio	Debt-to-Income Ratio					Debt-to-Income Ratio
	Class 1	Class 2	Class 3	Class 4	Class 5	
≤ 30	6	7	7	8	9	Class 1 > 20.00
30.01–40.00	7	8	9	10	11	Class 2 20.00–29.99
40.01–50.00	9	10	11	12	14	Class 3 30.00–39.99
50.01–60.00	10	11	13	14	16	Class 4 40.00–49.99
60.01–65.00	11	12	14	15	17	Class 5 ≥ 50.00
65.01–70.00	12	13	15	16	18	

### Hong Kong Residential Mortgages Breakdown by Product Type



\*Includes staff mortgage loans and hybrid loans.  
Source: Hong Kong Monetary Authority Survey.

linquency and default are a combination of the following factors:

- The financial resilience of the borrower, as evidenced by his DTI ratio.
- The effect of unexpected financial stress on the borrower, such as unemployment or divorce.
- The amount of equity invested in the home (LTV).

Fitch IBCA incorporates the two basic theories of mortgage default in its model, namely the borrower's ability and willingness to make monthly payments. A borrower's ability to pay is largely dictated by his income in relation to his debts — the more income, the better. In Hong Kong, the total

DTI is calculated by dividing total monthly debt obligations by monthly gross income. Total monthly debt obligations are defined as all financial obligations of a borrower with a maturity of more than 12 months. DTIs in Hong Kong are more conservative than DTIs in the US because personal income tax and social security tax in the US are much higher. The maximum personal tax rate in the US, including federal, state, and local, can be 36% or greater, while the maximum tax rate in Hong Kong is 15%. Therefore, by US standards, net income available for debt servicing in Hong Kong is greater than what the DTI would imply.

Lower DTIs also allow for the greater absorption by the borrower of financial shocks. In many countries, unemployment and divorce are the two most common reasons for borrower default. Contributing to the lower probability of borrower default in the Hong Kong market are the very low rates of divorce and unemployment, averaging approximately 1.3% and 2.58%, respectively. Historical Hong Kong unemployment rates are set out in the chart on page 4.

The equity or willingness-to-pay theory states that the borrower's perceived equity in the property dominates the decision to default if the borrower is in

financial distress. Additionally, the equity theory assumes that a large initial down-payment reflects a borrower of higher financial means. Fitch IBCA believes a borrower is more willing to pay if he has made a substantial down-payment at origination, regardless of declines in home prices that might cause the erosion of equity over time. Consequently, lower LTV loans (less than 60%) are expected to have low default rates. The current Hong Kong maximum LTV at the time of origination on a mass residential housing mortgage is 70%, as endorsed by the HKMA through guidelines to authorised lending institutions (AI). According to a survey conducted by the HKMA in 1997, the average Hong Kong outstanding mortgage has an outstanding LTV of 52%. This is very low compared to the US and parts of Europe; low LTVs also limit loss severity.

Fitch IBCA uses all the aforementioned factors in the Hong Kong mortgage default model to determine base default rates, as outlined in the table on page 4.

**Default Probability Adjustments:** Fitch IBCA adjusts the base default rates on a loan-by-loan basis to account for individual loan characteristics of the collateral across all rating levels. Default rates may be adjusted for product type,

### Delinquent Loans/Total Outstanding Loans in Hong Kong

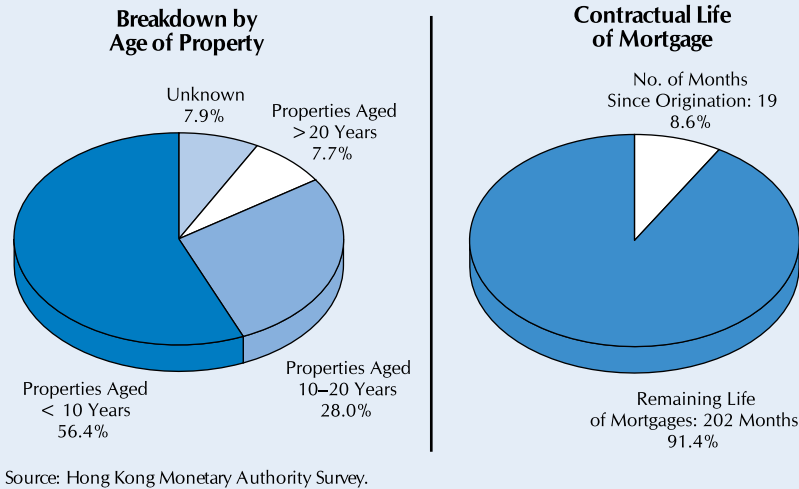
(%)

Number of Days from Payment Due Date	September 1994	Year-End 1995	Year-End 1996	September 1997
31–60 Days	N.A.	0.59	0.48	0.040*
61–90 Days	0.30	0.20	0.13	0.10
91–120 Days	0.05	0.08	0.10	0.04
>120 Days	0.08	0.12	0.11	0.06
Loan Delinquency Ratio (Amount of Loans Overdue)				
> 60 Days	0.43	0.40	0.34	0.20
> 90 Days	0.13	0.20	0.21	0.10
Number of Reporting Authorised Institutions	32	29	35	39

\*Only 38 authorised institutions have submitted data. N.A. – Not available. Note: The delinquent loans reported as of September 1997 were seasoned on average 22 months. The average loan-to-value ratio of these loans was 62.8%; the market average was 52.0%. Mortgagee actions (in the form of repossession of the property) generally took place about 12 months after the loans were overdue for one month. In all default cases, the loan amount was fully recovered. Source: Hong Kong Monetary Authority Survey.



### Hong Kong Residential Mortgages



All mortgages have prepayment penalties should mortgagors completely repay the loan during the first year and some include penalties for partial prepayments during the first year. Penalties range from two to five months of interest or 3% of the original loan balance.

Fitch IBCA's base probabilities of default take into consideration the product types described earlier and, therefore, no additional adjustment is made for default probability with respect to these loans. To the extent additional product types are offered and securitised, depending on the product characteristics, default probability may be adjusted.

**Loan Purpose:** Most loans advanced in Hong Kong are for the purchase of owner-occupied flats and not for refinancing or investment. Refinancing only accounts for 8.3% of all mortgages (*see chart below*). Fitch IBCA does not penalise mortgage loans advanced to purchase a home or those advanced to refinance existing loans. However, Fitch IBCA views mortgage loans advanced to release equity in the home (equity refinance mortgages) as risky because the homeowner is essentially borrowing back his equity based on the home's price appreciation. Because the loan is advanced on the basis of the

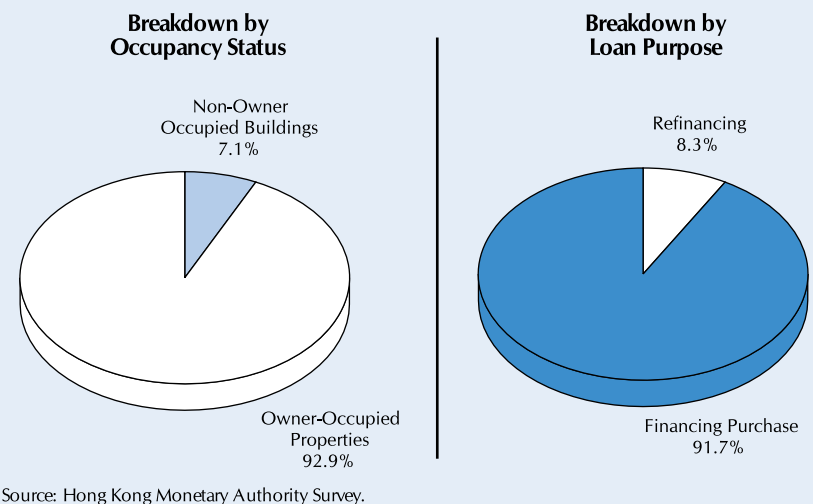
loan purpose, second home/investment property, arrears status, borrower profile, seasoning, age, and underwriting quality.

**Product Type:** Approximately 92% of mortgages originated in Hong Kong are floating rate, 99.9% of which is indexed against the prime rate, formerly the Best Lending Rate (*see chart, page 5*). The prime rate is set and reviewed by the Hong Kong Bankers' Association during a weekly meeting. Hong Kong mortgage lenders offer floating-rate mortgages with maturities ranging from 10-40 years, with the most popular being the 15-year mortgage. Recently, the HKMA has taken steps to increase the percentage of fixed-rate mortgage loans (pilot program launched during the first quarter of 1998); however, there continues to be resistance by the AIs. One of the factors behind the resistance is the inability of these entities to economically hedge the asset/liability mismatch of long-term fixed-rate Hong Kong dollar loans. There are no interest rate caps or floors in Hong Kong mortgages.

Unique to the Hong Kong market is the feature of fixed tenor versus variable tenor. The fixed tenor structure adjusts the monthly payment amount when-

ever the prime rate fluctuates, so that the mortgage amortises within the set terms of the maturity. The variable-tenor structure keeps the monthly payment amount the same and extends the amortisation schedule to the maximum maturity date, usually 30 years, after which, the monthly payments will adjust like fixed-tenor mortgages. Note that the AI has the option to extend the maturity date and not the mortgagor. Approximately 70.9% of all floating-rate mortgages are fixed tenor and 29.1% are variable tenor or a combination of the two options.

### Hong Kong Residential Mortgages



home's appreciated value, appraisals on refinancings are critical to the underwriting process. Fitch IBCA reviews the issuer's appraisal process, as well as all underwriting guidelines, when meeting with the originator's management. On completion of this review, if Fitch IBCA believes these loans have an increased likelihood of default, the base default probability will be adjusted by 10%–25%. For loans advanced to construct homes, Fitch IBCA expects construction to be completed prior to the loan being included in the pool for securitisation.

**Mortgages Up to 90 Days in Arrears:** When rating a portfolio combining current and arrears mortgages, Fitch IBCA increases base default rates for mortgages in arrears up to 90 days by 25%–75%.

**Second Homes and Investment Properties:** While information about mortgage performance for second homes and investor properties is limited, Fitch IBCA assumes that these properties are considerably more susceptible to default. Accordingly, Fitch IBCA increases base default rates by 10%–25%.

Furthermore, Fitch IBCA's analysis has indicated that one of the factors driving

the market value volatility experienced in the Hong Kong market may be an unreported number of cases where the mortgage loans were originated not for owner occupation but for investment. Fitch IBCA's default model has incorporated the probability that some owner-occupied flats are leased and financed for investment purposes, (*for information on occupancy status in Hong Kong, see chart at the bottom of page 6*).

**Borrower Profile:** Fitch IBCA believes that self-employed borrowers have a greater probability of default than borrowers who are paid a salary, depending on the nature of their business. Fitch IBCA increases default probability on loans to self-employed borrowers by a factor of 30%.

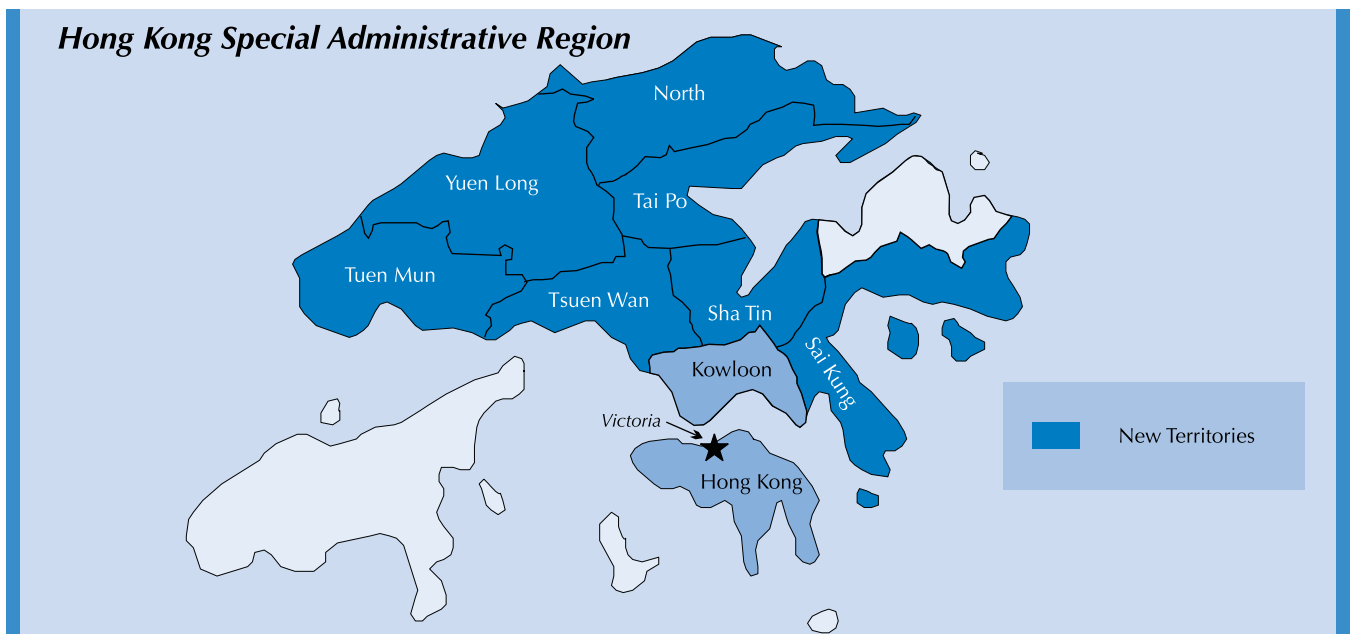
**Underwriting Quality:** When applying the default probability matrix, Fitch IBCA also considers a lender's underwriting guidelines. Fitch IBCA views a lender favourably if he limits loan amounts based on borrower income and debt and if a thorough borrower evaluation is carried out, including checks for negative credit information. However, since there are no major credit bureaus in Hong Kong, the checks should include an analysis of employ-

ment statistics, historical performance on other credit facilities provided by the lender (including credit cards and personal or business loans).

Fitch IBCA's review and analysis of the originator of this process determines whether Fitch IBCA decreases default rates by up to 25% or increases them by 0%–200%. The areas of focus for Fitch IBCA's review of an originator and servicer are summarised on page 11.

## Loss Severity

**Components of Loss Severity:** It has long been recognised in the mortgage industry that mortgage performance is affected by changes in economic conditions. The risk created by serious economic downturns can be severe. Home prices and repossession rates can fluctuate dramatically with bank losses escalating if a surge in foreclosure rates coincides with a downturn in home prices. Fitch IBCA's Hong Kong default model quantifies loss severity (or, conversely, recovery value) using several factors, including market value trends, costs (such as foreclosure and carrying costs), and LTV.



## Property Classifications

Class	Size Ranges (m <sup>2</sup> )
A	Up to 39.9
B	40.0–69.9
C	70.0–99.9
D	100.0–159.9
E	160.0–279.9

m<sup>2</sup> – Square meter.

To capture true market value movements for Hong Kong, Fitch IBCA divided Hong Kong into three regions and, within each region, examined changes in home price by class from 1977 until the present. The three major regions are Hong Kong, Kowloon, and New Territories. The four classes of flats (as established by the HKRV and endorsed by the HKMA for mortgage lending purposes) are A, B, C, and D/E; the classification indicates the size of the flat (see table above). Fitch IBCA focused on the worst-case historical price decline and volatility to develop base market value decline (MVD) assumptions for the Hong Kong residential default model. These worst-case regional declines were then stressed increasingly to formulate MVDs from 'BBB' to 'AAA'. The resulting regional declines are depicted in the table below right and represent Fitch IBCA's base MVD assumptions for properties classified as A or B.

**Market Value Adjustments:** Fitch IBCA adjusts the base market value assumptions on a loan-by-loan basis to account for individual loan characteristics of the collateral across all rating levels. Market values may be adjusted for property size and ownership status.

**High-Value Properties:** Homes with relatively high market values within a region (those classified as C or D/E) are generally subject to higher MVDs in a deteriorating market than homes with average or below-average market values due to limited demand for such properties. Imprecise pricing information, caused by the lack of comparable benchmark homes, also influences the

amount of price volatility during a market downturn. Fitch IBCA will increase base MVD assumptions to account for this increased risk.

**Property Ownership:** Flat owners usually possess their land on a leasehold basis. This ownership status represents a higher credit risk; as the lease approaches expiration, it tends to depreciate the value of the leasehold property as a new lease will have to be renegotiated at the homeowner's expense. For this reason, Fitch IBCA requires that leases expire in a reasonable period of time beyond the life of the loan (see *Hong Kong Property Law*, page 9).

**Age:** Approximately 56.4% of the properties in Hong Kong are less than 10 years old, approximately 35.7% are more than 20 years old, and 7.9% are unknown (see chart at the top of page 6). Fitch IBCA may increase loss severity properties or may require their removal from the collateral pool if property value is limited due to age.

**Building and Development Concentration:** Many banks have relationships with particular property developers, whereby the bank or a consortium of banks have exclusive right to provide mortgage financing for a particular housing development. Many housing developments have 15 towers. Each tower may have 30 plus floors. Depending on the target market, each floor may have two to eight flats of various sizes. The more upscale the target market, the larger the apartment and the lower the number of flats per floor. Fitch IBCA may increase the loss severity if

there are concentrations greater than 5% by development and/or building.

**Insurance:** There are several options in obtaining insurance for residential mortgages, including master, block, and individual policies. Most banks have a relationship with specific insurance companies, whereby such insurance companies underwrite the first year of coverage, a master policy. Block policies are used when the building management company has relationships with specific insurance companies and requires all tenants to obtain insurance from these providers. In an individual policy, the mortgagor can approach a different insurance provider for coverage, usually from the bank's list of authorised insurance companies. According to current market practice, only fire insurance is required. Other forms of insurance may be requested or provided, depending on the bank. Fitch IBCA will verify that the insurance policy provides coverage for damage from fire in an amount at least equal to the mortgage loan and includes a mortgagee payee clause regarding the distribution of payments to the mortgagee.

Fitch IBCA will analyse the concentration of insurance providers within a building and development as well as the claims-paying ability of these insurance companies. Fitch IBCA may adjust the loss severity should the insurance coverage prove to be weak or certain legal language is not included in the contract.

**Foreclosure and Carrying Costs:** When calculating recovery value, Fitch IBCA's model reduces the property valuation

## Market Value Declines

(%)

Region	'BBB'	'A'	'AA'	'AAA'
Hong Kong	40	45	50	55
Kowloon	46	51	56	61
New Territories	49	54	59	64



by foreclosure costs and the cost to the administrator of carrying the loan from delinquency through to default. Foreclosure costs include administrative expenses of approximately HK\$100,000, selling costs of approximately 1% of market value, and legal costs of 4% of loan balance at the time of possession. This estimate is based on actual cost data supplied to Fitch IBCA and may be adjusted as costs structures change in the industry.

To calculate carrying costs, Fitch IBCA assumes the borrower does not pay interest for 18 months and that the interest rate is 15% on all loans during this time. The 18-month time frame is based on worst-case estimates obtained from several leading Hong Kong mortgage originators. The 15% interest rate is based on worst-case historical mortgage interest rates plus a spread.

### **Credit Enhancement**

Fitch IBCA calculates credit enhancement for each loan in a mortgage pool by multiplying default probability by loss severity. An example of this calculation is set out in the table on page 10.

### **Liquidity Coverage**

MBS transactions require liquidity to cover short-term delinquencies as well as long-term shortfalls. Assumptions regarding liquidity requirements can vary dramatically because the timing of delinquencies and shortfalls is difficult to predict. For this reason, Fitch IBCA uses a worst-case methodology to determine the level of liquidity required to cover delinquencies and defaults and takes the weighted average default probability for a given pool of mortgages as the base indicator. Because liquidity coverage is closely related to the quality and efficiency of mortgage administration, as well as the quality of the collateral, Fitch IBCA tailors the calculation of liquidity to the particular dynamics of each transaction that it rates.

For short-term delinquencies, Fitch IBCA assumes that payment will be received within a maximum of 12 months and that interest will accrue during this period at 15%. Fitch IBCA also assumes that no more than half of these loans are likely to become delinquent at any one time, working on the assumption that monthly delinquencies at any given time will represent half the level of cumulative defaults.

For long-term payment shortfalls, Fitch IBCA typically assumes that payment will be received within a maximum of 18 months from the point of default and that interest will accrue at 15%. Fitch IBCA then adjusts weighted average default probability to reflect its estimation of the number of loans likely to be in default at any one time.

### **Operations Review**

A key factor in evaluating and rating a pool of mortgage loans is the quality of the operations and procedures of the underlying mortgage originator/administrator. There is a direct correlation between the origination and servicing functions and the performance of a collateral pool. Fitch IBCA may increase or reduce credit enhancement based on the quality and experience of the originator and administrator. Underwriting guidelines, appraisals, and collection procedures are of particular importance.

Fitch IBCA reviews the operations of the originator/administrator, determining whether the company's procedures, controls, and performance are acceptable. Interviews, procedural reviews, and loan level analysis are performed, not only to determine if operations comply with industry and investor guidelines, but to ensure that the proper controls are in place for a given transaction.

Fitch IBCA tailors its review to the requirements of each issuer and investor, as well as the nature of the transac-

tion involved. However, the key aspects of its approach are summarised in the checklists on page 11.

### **■ Hong Kong Property Law**

Prior to the transfer of Hong Kong from the British Crown to the PRC on July 1, 1997, it was the practice of the Hong Kong government, being the ultimate holder of land, to grant only leasehold interests to land purchasers. Since the handover, it continues to be the case that all existing government leases will continue to be recognised and protected under the laws of the HKSAR. Accordingly, land tenure in Hong Kong continues to be leasehold, and owners of property in Hong Kong are effectively long leaseholders.

Most land is sold by the government at public auction to the highest bidder, subject to the purchaser paying a premium and government rent and signing certain terms and conditions of sale, upon which the purchaser is entitled to lease and develop the land. The terms of government leases and sale conditions vary. Historically, Crown leases were granted for periods of 75, 99, or 999 years, with or without the right of renewal. Currently, Crown leases are granted for a standard term of 75 years, with the right of renewal in Kowloon and Hong Kong. In the New Territories, Crown leases were extended (at the time of the handover) until June 2047.

Since most sales and purchases and mortgages relate to units within a housing complex, the HKSAR does not issue a separate lease for each unit. Instead, each flat is equated with several undivided shares according to a deed of mutual consent (DMC) that will provide for exclusive use and possession of the purchased unit. A DMC is binding on all original and future owners of the flats.

### Loan-Level Credit Enhancement Calculation

Desired Rating	'AAA'	<b>Loss Severity Calculation (HK\$)</b>	
Property Value (HK\$)	2,000,000	Loan Balance	1,400,000
Region	Hong Kong	Property Value	2,000,000
Loan Balance (HK\$)	1,400,000	Less Market Value Decline (55%)	1,100,000
Loan-to-Value Ratio (%)	70	Less Foreclosure Costs	165,000
Debt-to-Income Ratio (%)	35	Less Carrying Costs (15% for 18 months)	315,000
Property Purpose	Investment	Equals Recovery Value	420,000
<b>Default Probability Calculation (%)</b>		Loss Severity: (LS) = (Loan Balance – Recovery Value)/	
'AAA' Base Default Probability	15	(Loan Balance)	= 70.0%
Investment Property	25	Credit Enhancement Required = DP x LS =	13.3%
Default Probability (DP)	18.75		

\*Example assumes no mortgage insurance.

The land registration ordinance provides for registration of all instruments affecting land in the relevant land registry. Although the sale conditions may require the registration of all mortgages and assignments, there is no statutory requirement that such documents must be registered. Non-registration of any instrument that is registerable does not make such instrument invalid. However, registration insures protection of title.

#### ■ Foreclosure Process

Generally, a mortgagee can enforce its security by applying to the court for foreclosure, taking possession of the property, exercising its power of sale of

the property, or appointing a receiver to manage and take control of the property or its income. A mortgagee may also take an action in debt against the mortgagor if the mortgagor fails to pay or is in breach of any other covenants.

A foreclosure order is made by the court upon the application of the mortgagee if a mortgagor fails to repay the loan on the payment date or if there is a breach of any term of the mortgage. A foreclosure order extinguishes the mortgagor's personal covenant to pay and vests the ownership of the property in the mortgagee. Upon default by the mortgagor, the mortgagee may exercise its power to take possession of the property. Pos-

session of the mortgaged property can be obtained by means of a court order.

A power of sale cannot be exercised until notice requiring payment of the mortgage has been served on the mortgagor and the default has lasted for one month after service of the notice, interest is in arrears and unpaid for one month after the due date, or there has been a breach of other covenants. The mortgagee, in exercising its power of sale, does not require an order of the court to proceed with the sale of the property.

Mortgage actions (in the form of repossession of the property) generally take about 12 months from first delinquency.

## Mortgage Origination Checklist

### **Underwriting**

- Underwriting experience
- Adequate training
- Compliance with guidelines
- Process for approving third-party originators\*
- Process for reunderwriting third-party loans\*

### **Appraisal**

- Management experience
- Formal review process
- Appraisal examples
- Use of approved appraisers
- Completion of appraisals to industry standards

### **Quality Control**

- Management and staff expertise
- Conformity with guidelines
- Documented procedures
- Involvement in early payment defaults and foreclosures

\*If applicable.

## Servicing Checklist

### **Collections/Workout**

- Management experience
- Collector experience
- Formal collection strategy
- Familiarity with industry guidelines
- Tracking system
- Level of borrower contact

### **Foreclosure/Bankruptcy**

- Management and staff experience
- Committee foreclosure approval
- Familiarity with state requirements
- Selection of lawyer and monitoring
- Property inspections

### **Property Management**

- Marketing strategy
- Compliance with industry and government guidelines
- Expense management
- Security, protection, and repair of properties

### **Servicing Quality Control**

- Management involvement and reporting structure
- Formal review process
- Compliance with government guidelines
- Number and severity of quality control exceptions and adequate follow-up

Copyright © 1998 by Fitch IBCA, Inc., One State Street Plaza, NY, NY 10004  
Telephone: New York, 1-800-753-4824, (212) 908-0500, Fax (212) 480-4435; Chicago, IL, 1-800-483-4824, (312) 214-3434, Fax (312) 214-3110;  
London, 011 44 171 638 3800, Fax 011 44 171 374 0103; San Francisco, CA, 1-800-953-4824, (415) 955-0529, Fax (415) 955-0549  
Barbara A. Besen, Publisher; John Forde, Editor-in-Chief; Madeline O'Connell, Director, Subscriber Services; Jason H. Kantor, Manager, Publishing Technology;  
Nicholas T. Tresniowski, Senior Managing Editor; Diane Lupi, Managing Editor; Jennifer Hickey, Andrew Simpson, Editors; Jay Davis, Martin E. Guzman, Paula  
Sirard, Senior Publishing Specialists; Harvey Aronson, Publishing Specialist; Robert Rivadeneira, Publishing Assistant. Printed by American Direct Mail Co., Inc.  
NY, NY 10014. Reproduction in whole or in part prohibited except by permission.

Fitch IBCA ratings are based on information obtained from issuers, other obligors, underwriters, their experts, and other sources Fitch IBCA believes to be reliable. Fitch IBCA does not audit or verify the truth or accuracy of such information. Ratings may be changed, suspended, or withdrawn as a result of changes in, or the unavailability of, information or for other reasons. Ratings are not a recommendation to buy, sell, or hold any security. Ratings do not comment on the adequacy of market price, the suitability of any security for a particular investor, or the tax-exempt nature or taxability of payments made in respect to any security. Fitch IBCA receives fees from issuers, insurers, guarantors, other obligors, and underwriters for rating securities. Such fees generally vary from \$1,000 to \$750,000 per issue. In certain cases, Fitch IBCA will rate all or a number of issues issued by a particular issuer, or insured or guaranteed by a particular insurer or guarantor, for a single annual fee. Such fees are expected to vary from \$10,000 to \$1,500,000. The assignment, publication, or dissemination of a rating by Fitch IBCA shall not constitute a consent by Fitch IBCA to use its name as an expert in connection with any registration statement filed under the federal securities laws. Due to the relative efficiency of electronic publishing and distribution, Fitch IBCA Research may be available to electronic subscribers up to three days earlier than print subscribers.