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ABS Europe
Criteria Report

European Consumer ABS Rating Criteria

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■ Introduction

Fitch Ratings has launched a new methodology to model portfolio default and portfolio loss levels for European consumer ABS transactions. The methodology applies a Monte Carlo simulation tool to measure portfolio risk in consumer ABS transactions, and is a further step towards harmonisation of risk modelling techniques within Fitch's structured finance team.

The main quantitative tool for this new methodology will be the Fitch Default VECTOR ABS model ("VECTOR ABS"), which is used in conjunction with a traditional cash flow model. VECTOR ABS has been developed on the analytical framework of the Default VECTOR model for CDOs. The application of VECTOR ABS allows Fitch to model consumer ABS transactions incorporating the following features:

- application of loan-by-loan Monte Carlo simulation;
- loan-by-loan specific default, recovery and correlation assumptions;
- application of tiered recovery rates on a loan-by-loan basis;
- incorporation of individual obligor concentrations; and
- portfolio feed function based on portfolio stratifications.

Inputs into VECTOR ABS are fully flexible, and Fitch's assumptions can be overwritten by the user. Thus the model can also be applied to carry out sensitivity analysis, or to determine consumer portfolios' risk with assumptions set under the Basel II framework.

VECTOR ABS is freely available, and will be supplemented by a manual describing the application of the model. Together with a cash flow analysis under Fitch's proprietary ABS cash flow model and a thorough legal and structural analysis, VECTOR ABS will form the cornerstone of Fitch's European consumer ABS analysis. The new methodology applies to portfolios of both unsecured and secured consumer loan and highly granular leasing transactions in Europe, the Middle East and Africa, with the exception of credit card securitisations.

This criteria report outlines the theoretical framework behind VECTOR ABS, explains the generation of necessary input assumptions into the model and gives guidance on how to read and interpret the model's output. It also introduces the various asset types securitised in European consumer ABS, explains the qualitative analysis carried out at the originator and servicer level, describes Fitch's cash flow modelling assumptions and how they are stressed for various target ratings, and details the standards applied by the agency in its structural and legal analysis.

The new criteria for rating European consumer ABS will become effective as of 11 October 2006, and replaces and supersedes the past criteria, namely "*Kicking the Tyres: An Overview over European Auto ABS*", and "*Rating Unsecured Consumer Finance ABS in Europe*".

■ Consumer ABS – Asset Classes, Origination Channels and Product Types

Fitch defines a consumer ABS transaction as a securitisation of a portfolio of payments owed by retail obligors as a result of financing arrangements for the purchase or use of consumer goods. Retail obligors can be private individuals or small corporates. What ultimately constitutes a retail obligor is typically driven by the originator's segmentation of its portfolio and the way it determines and reports obligors' credit quality and historical performance. While the latter is typically reported in the form of static vintage data, the former varies from originator to originator and can span from acceptable versus unacceptable for less sophisticated originators to the determination of a default probability per obligor for the more sophisticated ones.

Although consumer ABS and residential mortgage-backed securitisations ("RMBS") often contain credit risk against the same type of obligor, namely private individuals, the default behaviour of one obligor on the two different products varies, as mortgage financing constitutes a long-term investment for an obligor, whereas financing of a consumer good is typically for consumption purposes. This is evidenced by the different underwriting
standards of originators, and also reflected in the type of credit analysis carried out by Fitch for the two different products.

The same would apply for portfolios of claims against small- and medium-sized enterprises ("SMEs"). While these portfolios are often very granular and as such comparable to consumer debt portfolios, the credit risk and the joint default behaviour of corporates expressed by the correlation is different to retail obligors.

This criteria piece applies to both secured and unsecured consumer obligations. There is no clear distinction between secured and unsecured obligations, and while an originator may well take some form of security, for example, a guarantee, Fitch may treat the obligation as unsecured. In the agency's sense, a secured consumer obligation is a claim that is backed by a financed object of sustainable value, which is pledged to the issuer to satisfy its claim upon default of the obligor. The classic secured consumer debt is the financing of a car, with point-of-sale financing of, for example, a purchase of furniture marking the opposite end of the spectrum, i.e. unsecured debt.

Lending to retail obligors has become increasingly interchangeable with leasing to retail obligors, particularly in the auto sector, and while the two products may vary from a tax or accounting perspective, a consumer lease is very close to a consumer loan, and differences are often only semantics, created for marketing purposes only. Product features are often the same, and in both instances the obligor pays a regular monthly instalment equal to the cost of financing of the leased/financed goods, plus a principal component that is either used to reduce the outstanding debt or to cover the depreciation of the leased object.

Fitch expects consumer ABS issuance to grow further over the coming years. This is caused by banks growing their consumer lending business to generate profits and the need to fund this business in the capital markets, and by retailers and manufacturers using consumer loan and leasing business as a tool to bolster production and sales of their core products. Beside the already established European consumer lending markets in Germany, Italy, Spain, Portugal, France and the UK, Fitch expects to see, in particular, originators from central and eastern Europe coming to the market as consumers in this region catch up with consumer spending given the economic upswing in these regions.

Origination Channels

European consumer debt is typically originated either by banks or finance companies. On the bank side, loans can be originated either through the branch network, on-line through new media or by telephone and mail, or at the point of sale. Bank or leasing captives owned by auto manufacturers originate the majority of their business at the dealer level, with contracts either referred by the dealer's sales person, or by agents located at the outlet. Unaffiliated finance companies often make use of the dealer's sales person as an agent, supported by their own staff at the regional level.

The nature and key objective of the originator's consumer lending business is an important consideration when analysing consumer ABS portfolios. While banks and independent finance companies have the primary aim to generate profits with their consumer finance business, captives typically state the support of the manufacturer's business, namely the production and sale of vehicles, as their primary aim. This can be reflected in the products offered as well as in the underwriting and servicing standards applied.

Table 1: Overview of Various Product Types

Product Type	Amortising Loans	Balloon Loans	Leases
Type of payment	Equal instalments	Equal instalments followed by one final balloon payment	Equal instalments sometimes followed by final residual value payment*
Ownership of asset if applicable	Borrower	Borrower	Lessor
Residual value risk	None	Typically with borrower*	Typically with lessor*

* But see product descriptions below
Source: Fitch

Product Types

Due to the fungibility between consumer loan and consumer leasing products, the same product features may appear both in consumer loans and leases. The key difference results from the different ownership structure in the two product types: while a loan is granted to enable the borrower to purchase the consumer good, with a lease ownership typically remains with the lessor. Consequently, risk associated with ownership such as value depreciation of the financed good remains with the owner i.e. lessor. Nevertheless, there are some leasing products where these risks are transferred to the user, i.e. the lessee. The differing product types seen across the consumer industry are summarised below.

Fully Amortising Instalment Loans

These are fully amortising loans, which involve a series of equal instalments over a predetermined period. The monthly instalments typically reflect the fraction of the sum of loan amount, plus interest over the full tenor, plus fees, over the term of the loan expressed in months. This product type is very common in the unsecured consumer business, but is also seen in secured lending such as where the value of the financed goods is relatively low: for example, used vehicles.

Balloon Loan Products

Balloon loans have become increasingly popular within the auto market, since they reduce the monthly instalments at the expense of one final "balloon" payment. While the balloon amount varies, it can be anything up to 90% of the original contract amount. At the end of the term, the obligor is usually obliged to make the balloon payment in full to be released from future liability. However, often the lender offers to refinance the final payment with a new instalment loan contract.

The main motivation for obligors taking out these types of loans is the affordability of lower instalments. For the lender, the motivation to offer such a product is to attract more borrowers due to the lower instalments and to effectively draw the borrower into a long-dated amortising loan by refinancing the balloon obligation, or to support new sales for the manufacturer as it is only this loan product that makes a more expensive new vehicle affordable to the purchaser. The apparent balloon risk for the borrower is often mitigated by either a put option for the borrower to return his vehicle at a predetermined price, or by a call option for the dealer to repurchase the vehicle at maturity of the contract. While in the latter case it is clear that the borrower takes the credit risk and the risk of the dealer's willingness to repurchase, it must be remembered that even with a put option in hand the borrower still takes the dealer's credit risk and the obligation to make the balloon payment ultimately lies with the obligor.

Due to the higher perceived affordability of balloon products, they may attract less creditworthy customers who represent a higher level of risk associated with higher default levels. Hence Fitch will study the setting of the contract term in relation to the balloon, along with historical performance, to gauge the type of customers targeted by the product. The agency will also look at the historical coverage of the balloon payment and its impact on the borrowers' performance, to take a view on whether this performance can be assumed to be upheld in higher stress scenarios. To date, covering mechanisms often have been effective such that the performance experienced in a base case scenario didn't deviate significantly from that of amortising loans.

Consumer Leasing Products

A key consideration in the analysis of consumer leasing securitisations is whether the motivation of the transaction is only to securitise future lease instalments, or whether it is to refinance the full purchase price of the leased goods. While in the former case the risk to be analysed is the product of default risk on the lessee times the loss upon default, in the latter case it is again the product of default risk on the lessee times the loss upon default, plus the residual value ("RV") risk on the financed good at maturity of the contract, adjusted by the default probability of the entity covering this RV risk.

Consumer leasing products can be distinguished dependent on whether the lessee only pays regular lease payments over the tenor of the lease, with no further obligation other than returning the leased object at maturity (operating lease), or whether the

lessee has to make a final payment at the end of the lease and in return gains ownership of the leased good (finance lease). While in operating leases the RV risk typically lies with the lessor, in finance leases this risk is normally taken by the lessee. Finance leasing is therefore very much comparable to a balloon loan product.

With an operating lease, the lessee effectively pays for the use of the leased vehicle, and the instalments reflect the depreciation in value of the vehicle, plus the financing cost and a margin for the lessor. In a finance lease, the sum of the monthly instalments plus the final (RV) payment makes up the purchase price of the leased object plus the financing costs of the lessor. Setting the future RV will then determine the amortisation profile of the lease with higher RVs leading to lower monthly lease instalments, and vice versa. Lower lease instalments will be attractive to lessees and therefore help to promote the leasing business, which in turn will generate higher sales volumes. However, if the RV risk is borne by the lessee, he may carry a higher default risk on the final instalment, in particular when the actual second-hand market value is lower than the set RV as per the contract.

In finance lease transactions, typically this final instalment is securitised and paid out from the issuer to the originator at the closing date. If at the tenor of the lease the actual second-hand market value is below the predetermined RV, the transaction might suffer a loss, dependent on the structural coverage of such shortfall. Therefore, the coverage of the RV is a key consideration in the analysis. The mechanism may vary, and dependent on which party takes this risk, it might be passed on to investors. The following structures have been seen:

- The lessee covers the RV risk, and any negative difference between the actual second-hand market value and a predetermined RV has to be paid for by the lessee at the tenor of the lease contract. The risk to the transaction would be that the lessee would not be able to cover an increased final instalment and would default on this amount.

- The dealer or the originator fronts the lessee for any RV shortfall. In these instances, the credit risk of these parties rests with the lessee, and the risk to the transaction is a joint default of both the dealer/originator and the lessee.

- The purchaser of the predetermined RV, i.e. the issuer, carries the RV shortfall.

While in the last case the RV risk is unconditional for the issuer, in the two earlier cases it is conditional upon the default of the parties covering this risk. This presents an additional risk in auto lease ABS transactions with a RV element to them, and Fitch discusses its analysis in more detail in its report entitled "*Residual Values in European Auto ABS – Securitising Market Risk*", published on 11 April 2006 and available at www.fitchratings.com

■ Rating Process and Kinds of Ratings

Typically the rating process is initiated by an originator or its arranger who wants to securitise a consumer ABS portfolio. The first step is usually the review of a term sheet outlining the key elements and the structural framework of the transaction. This is then followed by a review of the originator and the servicer (see section entitled *Originator Review and Servicer Evaluation*) to determine the motivation behind the transaction and to assess the impact of the originator's underwriting standards and procedures on the portfolio's defaults and loss history. The servicer, which may often be the same entity as the originator, is reviewed with regards to its ability to manage and service the portfolio appropriately, both for current and delinquent or defaulted loans.

Often in parallel, Fitch analysts work on the determination of the portfolio's quality and the probability of defaults in the portfolio. The latter may be derived from historical vintage default data, or from obligor-by-obligor default probabilities either produced by the originator or the agency. Recovery rate assumptions are also derived from historical vintage recovery data.

Next, Fitch will review the proposed structure, and its impact on the cash flows of the transaction. Various cash flow scenarios simulating specific default and prepayment patterns are run to determine if the proposed structure of credit enhancement and the priority of cash flows are sufficient to meet the targeted ratings. Interest rate and currency stresses are incorporated in these stress runs as well.

Legal documentation will be reviewed to ensure that the structure is clearly defined, that the cash flow model applied is mirroring the provisions in the various transaction documents, and that the documents reflect those elements of the structure which are fundamental to Fitch's rating methodology. Legal opinions will be typically provided to confirm that the true sale of the assets has been perfected and that the transaction documents are legally valid, binding and enforceable against all transaction parties. After the transaction has closed, Fitch will monitor the ABS' performance and adherence to guidelines through ongoing surveillance based on information provided as outlined in the agency's post

issuance reporting standards (please also see section *Performance Analytics and Reporting Standards*).

Kinds of Ratings

Consumer ABS are typically rated with multiple tranches of liabilities of varying credit quality and seniority. Ratings assigned by Fitch address the likelihood of a particular tranche performing in accordance with the terms of the notes. For example, ratings may give particular weight to the tranche's ability to pay timely interest and ultimate principal by final maturity. If the terms of the notes allow for interest to be deferred and paid in kind ("PIK") the rating would address the ability of the notes to repay ultimate principal and interest by final maturity. In some other cases, the rating may address only the ultimate repayment of the investor's investment or a minimum internal rate of return ("IRR") or dividend yield, which may come from a combination of principal and interest. Fitch will give a clear description of what the rating assigned to a particular tranche addresses in its press releases, presale and new issue reports. The tenor of the analysed portfolio will also be incorporated in the rating through the application of the respective confidence interval to the portfolio default and loss distribution.

■ Determination of Portfolio Quality – Default Probabilities and Recovery Rates

To assess the securitised portfolio's expected performance and to define inputs into the VECTOR ABS model, the agency establishes base cases on two performance parameters:

- cumulative defaults over the term of the portfolio; and
- cumulative recoveries on the defaults in the portfolio.

To develop these assumptions, Fitch looks to receive a minimum of three to five years of historical data. The minimum time to be represented by historical data will depend on the economic environment during this period, the tenor of the underlying assets, and the trend predictable by the presented data. Fitch expects to see the historical performance data in amounts, i.e. defaulted amounts, recovered amounts and delinquent amounts.

Dynamic Versus Static Analysis

Unlike an originator's business, which is assumed to keep going indefinitely, consumer ABS transactions always ultimately enter into an amortisation period where the portfolio becomes static. Even if a transaction comprises a revolving period, it is typically structured such that at the beginning of the amortisation period the credit enhancement established at inception (or shortly thereafter) is still intact, and available to cover losses on the then-static portfolio.

This is why the agency looks for static data as opposed to dynamic data to derive its base cases on defaults and recovery rates. Dynamic performance data, such as series of defaults in a given month over the portfolio amounts in that month would be inconsistent with the static nature of the transaction. It would not only veil the timing of defaults i.e. the time from origination to default, but also gives misleading results when the underlying portfolio grows, shrinks or is just volatile, since the defaults observed in one month may not necessarily refer to all the loans in the portfolio in this given month.

Determination of Default Probability

Default Definition

The cornerstone of Fitch's credit analysis is the evaluation and interpretation of the historical cumulative default rate provided. It is therefore important that a common understanding be achieved between the originator and the rating agency on the definition of default. The definition of default is typically a date threshold beyond which an asset is classified as defaulted, or an asset that has gone straight into enforcement proceedings (e.g. because the obligor filed for insolvency). For example, an asset that is more than 90 days delinquent might be classified as defaulted. It goes without saying that the historical data reviewed by the rating agency should reflect the set definition of default in the transaction.

An accurate definition of "default" is an important consideration for the transaction. A default threshold set too low could lead to inflated default levels in the deal, with correspondingly high recovery rates. This may cause default triggers being hit too early, and proceeds from re-performing loans could be diverted into the interest waterfall dependent on the transaction's cash-flow structure. Conversely, a default threshold being set too high can be a drag to the transaction as well, since the transaction has to keep paying interest on the part of the portfolio balance that actually won't recover to make up this paid interest. Either way, an inappropriate definition of default may reduce the transaction's efficiency for the issuer since it may lead to increased credit enhancement levels.

Vintage Data and Base Case Default Rate

A static pool is a group of assets generated during a specific calendar period, typically a month, quarter or year, referred to as the "vintage" of the data. By that means an originator's total book can be divided

into sub-pools based on the calendar period in which each claim was originated or disbursed.

To project the performance of the assets in the portfolio to be securitised, expressed in a "base case", Fitch looks at the historical performance of a portfolio with assets of the same quality and composition from the respective originator. Ideally, base cases are determined for each individual product type securitised. The base case is determined by analysing a number of factors including the average default rate over the tenor of the underlying products, seasoning and trending. The base case is always set at the maximum tenor of the receivables that will be in the portfolio. *Appendix 1: Calculation of Base Case* gives a detailed explanation of how the agency would determine a cumulative base case default rate.

If historical data is volatile or shows a certain trend, Fitch investigates this further with a view to gaining a better understanding of the historical and likely performance of the pool. Potential reasons may be changes in underwriting or servicing standards or the impact of changed macroeconomic factors on the borrower base.

When interpreting historical defaults, the agency may also look into historical delinquency data, as this can provide insight into potential changes in future defaults. Growth in the total loans in the various aging buckets may indicate a potential for increased defaults in future. Fitch has also found that early stage delinquencies may indicate a relaxation in underwriting criteria, while later delinquencies may represent a change in servicing and collection procedures or a decline in economic conditions. Fitch discusses trends in delinquencies with the originator and may adjust base-case default assumptions if warranted by high or growing delinquency levels.

Use of Originator's Default Probabilities
More and more originators are now able to produce a probability of default ("PD") per loan or obligor by using sophisticated internal rating systems or scorecards. If such an obligor level PD is available, the agency may use this information as opposed to static vintage data to form a view on the obligors' default probability. To test the validity of the obligor level PDs, the agency would carry out a detailed analysis of the methodology behind such PD model, and test its predictive power by comparison against historically observed defaults in the originator's portfolio. Dependent on the outcome of such evaluation, the agency may then decide to use or not to use the borrower by borrower PDs, or to use them with an upward adjustment.

Adjustment for Seasoning
Where an originator presents a portfolio that is well seasoned, a proportion of defaults and losses will have already occurred. For such portfolios Fitch may want to make an adjustment based upon the remaining losses as a percentage of the outstanding pool amount as is explained in *Appendix 1: Calculation of Base Cases.*

For transactions with a revolving period, no adjustment is made for seasoning unless the eligibility and portfolio criteria state a minimum weighted-average seasoning for the portfolio will be maintained.

Determination of Recovery Rate
Assets that have been classified as defaulted may still generate some additional cash flow to the transaction by way of recoveries. It may be possible within a securitisation to give an element of credit for these, thereby reducing expected losses, which is why Fitch also analyses data on the amount and timing of recoveries.

Again, a static data analysis is carried out, with the time of default being the starting point for the recovery vintages, to estimate how long it takes for a company to recover funds from defaulted assets (*Appendix 1: Calculation of Base Cases*). This information is used to derive a cumulative recovery rate assumption and a time vector for recoveries, and to model the level and timing of cash flows a transaction can realistically expect to receive from defaulted assets to meet its obligations to investors. Recovered amounts that are received earlier allow the transaction to pay down notes more rapidly, thereby reducing the interest burden that must be carried by the performing assets. The agency may also form a conservative view on recoveries from other data provided by the originator, or from its understanding and knowledge of the market.

■ Originator Review and Servicer Evaluation
Fitch will conduct a complete review of the originator and servicer associated with each securitisation, and such review will typically be done at least once a year in the case of originators issuing multiple transactions per year. The review will focus on various aspects of the company and overall operations that may impact the quality of the receivables and performance of the securitisation including a discussion about the company's origination and servicing activities. The areas evaluated during the operational review include:

- corporate overview, including financial condition, management experience and corporate risk management;
- origination, underwriting and scoring models;
- staffing and training;
- procedures and controls;
- servicing;
- collections and default management; and
- technology.

Corporate Overview

A thorough understanding of the company's history, structure, strategic objectives, management experience and funding capabilities are key to the operational review undertaken by Fitch. An assessment of the financial condition of the originator (and servicer, if separate from the originator) will be carried out if a formal credit rating is not available, and may involve the Financial Institutions group to ascertain the organisation's financial stability.

Origination and Underwriting

The quality and consistency of the underwriting process is critical to the future performance of the receivables. Fitch's review includes an understanding of the originator's sourcing practices and how vendors are selected and monitored. In assessing the underwriting practices of the originator, which are becoming increasingly automated, the agency focuses considerable attention on the application receipt and data verification process, the loan approval process and how credit authority is delegated to underwriters. While Fitch does not have a particular preference regarding centralised or decentralised underwriting since originators have demonstrated success with both approaches, the agency does review the control mechanisms for decentralisation of underwriting authority.

Originators may use credit scorecards to assist in the underwriting process. Credit scoring is a method by which a large sample of defaulted loans is analysed to determine which variables are statistically significant predictors of default, allowing the efficient and accurate credit assessment of numerous applicants. Fitch will analyse the variables feeding the originator's scorecard and consider how and why these variables have changed over time. Fitch also takes into account how often scorecards are validated and reassessed to ensure the cards maintain predictive validity.

When the originator's scorecards produce obligor by obligor default probabilities (see section *Use of Originator's Default Probabilities*), such that the scorecards act as a probability of default model (PD model), the agency may use the generated default probabilities as an input into its loan-by-loan VECTOR ABS model (*see below*).

In reviewing the originator, Fitch will also ascertain the effectiveness of the company's fraud detection processes, especially as originators are expected to indemnify the pool against fraud in most consumer ABS transactions. As a minimum, the agency expects originators to employ money laundering checks, customer identity and address verification procedures and to participate in industry and national fraud detection schemes.

If the transaction is of a revolving nature, there is the risk that origination and underwriting standards deteriorate over time, such that the portfolio at the beginning of the amortisation period is not of equal quality to the historical portfolio used to determine the credit enhancement levels at the inception of the transaction. This might be particularly true when the originator's credit quality suffers, and its dependence on funding via securitisation increases. If the stop of replenishment upon a significant deterioration of the originator's credit quality is not an option since it would cut essential funding sources, the agency prefers to see regular pool audits carried out by third parties to check whether underwriting standards and eligibility criteria have been maintained.

Staffing and Training

The tenure and experience of the underwriting and servicing personnel is reviewed as is the organisational structure of both departments. Underwriters are expected to have strong consumer finance backgrounds while servicing staff should be experienced in administering receivables and for call centre personnel experience in collecting on secured and/or unsecured loans. Fitch also expects to see a well-documented training programme with specific requirements for new hires.

Procedures and Controls

Documented policies and procedures for both underwriting and servicing are critical to ensure corporate credit policies are followed, thus minimising potential defaults and losses. The originator should be able to make adjustments to its policies and procedures based on reviews of performing and non-performing portfolios. Fitch will also review the relevant reporting and decision-making procedures.

Quality control is another critical factor in Fitch's review of originators. Fitch reviews the level of exceptions to credit, which are a concern since they may indicate possible portfolio deterioration. Internal audit procedures should be in place as well to ensure compliance with all company procedures

and industry guidelines, and that appropriate follow-up action is taken for exceptions.

Servicing

In nearly all consumer transactions in Europe, the originator and servicer are the same entity. Given the pivotal role that the servicer plays in every structured finance transaction, careful attention is paid to a servicer's financial strength and ability to accommodate growth while maintaining collection and repossession procedures.

If the originator outsources the servicing to a third party, a full review is also carried out with this party. If the entity undertaking the servicing lacks a credit rating from Fitch, the appropriate analytical group within Fitch (Financial Institutions or Corporates) may be consulted to ascertain the financial strength and viability of the servicer. Along with discussions about procedures, staffing and training, the review will focus on specific servicing activities such as the setup process for new accounts, ongoing administration of existing receivables and client and/or investor reporting.

If the servicer holds funds belonging to the issuer, the credit quality of the servicer shall comply with Fitch's counterparty rating criteria as set out in *"Commingling Risk in Structured Finance Transactions"*, published on 9 June 2004 and available at the agency's web site at www.fitchratings.com.

The operational risk on the servicer, such that its default would leave the transaction without proper servicing, is typically addressed by a back-up servicing agreement. Dependent on the complexity of the servicing function, the standardisation of the asset class, the depth and width of the servicer market in the respective jurisdiction and the IT systems applied by the initial servicer, Fitch may expect to see a fully signed up back-up servicer from closing of the transaction. While for very complex servicing functions this may be applicable even when the servicer is of investment grade quality, sub-investment grade servicers may be viewed favourably for homogeneous and standardised asset classes. Regardless of the initial credit quality of the initial servicer, the servicing agreement should always specify the scenario in which a back-up servicer becomes involved, and what steps will be taken. The agency would expect the back-up servicer to receive regular data updates from the originator and be able to take over the servicing functions within a relatively short timeframe.

Collections and Default Management

During the servicer review, Fitch will evaluate the collection processes and loss mitigation tactics as well as the servicer's procedures surrounding enforcement and repossession of collateral in the case of auto finance transactions. The collections process should be flexible enough to allow the borrower sufficient time to correct the arrears while ensuring that appropriate action is administered in a timely manner when non-payment becomes inevitable. Along with tracking payment receipts, billings, insurance and monitoring borrower contact, the servicer's systems should also be able to generate information management reports. While many of the processes undertaken by the servicer relating to collections are automated such as delinquency letters and calling schemes using outbound diallers, Fitch will assess the use of these systems and may request demonstrations of the respective applications.

As there are various ways to organise the collections department within a servicing organisation, Fitch will review the servicer's specific structure, paying particular attention to how collectors are recruited, trained and organised as well as the tools used to manage each collector's performance. Regardless of how the collections department is structured, Fitch expects to see highly qualified collectors handling the more serious delinquent accounts.

Fitch will also review historical performance within the servicer's existing portfolio as well as for previous securitisations. For all transactions, the agency will review timelines from default to recovery, including the timeframe from actual possession to sale of the collateral in the case of auto finance transactions. Attention will also be paid to the write-off process, including timelines, average write-off amounts, collection of shortfalls if applicable and the approval process for authorising write-offs.

Technology

As part of the review of the originator and servicer (either together or as separate entities), Fitch will evaluate the adequacy of IT systems used to support the management of the portfolio, the administration of the receivables and, for revolving structures, the ongoing origination of accounts. The review will include an understanding of the company's IT infrastructure, including its network configuration and how the various applications used for origination, underwriting and servicing interface with one another. Disaster recovery and business contingency is also discussed as well as the company's process for ongoing systems development, and plans for upgrading or replacing existing systems.

■ VECTOR ABS

VECTOR ABS is a quantitative simulation tool to determine portfolio default levels and value at risk for a given credit portfolio. It takes as input, default probabilities and recovery rates as well as correlation between assets in a portfolio and models the distribution of portfolio defaults and losses using a Monte Carlo simulation.

VECTOR ABS is a fully flexible tool that allows the user to make his own input assumptions and to overwrite Fitch's base correlation assumptions. This means VECTOR ABS will not only allow the user to replicate Fitch's modelling results, but will also enable the user to carry out sensitivity analysis or to use the model for managing his portfolio risk outside a securitisation. VECTOR ABS is based on the same theoretical framework as the Fitch Default VECTOR model for CDOs, and simulation results are sized in the same analytical manner as for CDOs. VECTOR ABS is freely available at the agency's website at *www.fitchratings.com*, and will be accompanied by a user manual explaining hardware and software requirements as well as input fields and how to run the model.

Model Inputs

The VECTOR ABS model requires a number of inputs, which can be divided into two groups: the inputs describing the credit risk of individual assets in a portfolio and inputs that define the economic environment of the portfolio and correlations imposed by that environment.

Asset Level Inputs

Key parameters driving a loan's default and loss are the notional amount of the exposure, the tenor, PD and the loss severity (1 – recovery rate = "LS"). While it is possible to use the information at a loan-by-loan level, it is often not provided. Therefore, the following description focuses on product level information, although loan level information could also be used.

VECTOR ABS assumes that the portfolio can be divided into pools or products that are homogeneous with respect to the PD, LS and tenor. VECTOR ABS currently allows for a maximum of 16 distinct products. For each product, the model requires as inputs the PD, the recovery rate and the maximum tenor for that product. The maximum tenor used in the model should be consistent with the tenor used to derive the base case default probability, and the former should not exceed the latter. If the products in the portfolio show significantly different tenors, it is recommended to model the sub-portfolios individually.

The distribution of notional values for each product is also required. The user can define notional bands and assign the number of assets and the average outstanding balance of these assets to the band. The model allows for a maximum of 20 bands. The band definitions are largely arbitrary but must be consistent across products.

Where product-specific PDs will be available from the originator's PD model, these PDs can be used. Where such obligor-specific PDs are not available, the agency will determine a PD for each product from its vintage data analysis as described above in *Determination of Portfolio Quality*. Since the benefit of a simulation model increases the more exposure-specific data are applied, such vintage data analysis should be carried out at the most specific level possible, such that, for instance, each product type in the originator's portfolio demonstrates its own vintage data, and gets its own default assumption.

The exposure per obligor to which the default probability will be applied is the outstanding amount as of the closing date. This is theoretically consistent with the referenced basis both under a vintage data analysis and under originators' PD models. The tenor per obligation is derived from the maturity of the respective obligation, and the recovery rate will be derived from historical recovery data presented by the originator as described above in *Determination of Portfolio Quality*.

VECTOR ABS internally generates portfolios with up to 60,000 assets, which reproduces the characteristics of the original portfolio. Where portfolios contain more than 60,000 obligors, the model will automatically shrink the number of obligors to a number less than 60,000, without changing the credit-relevant characteristics of the portfolio.

Correlation Inputs

VECTOR ABS is a multifactor model, which means that the credit quality of the portfolio is dependent upon several risk factors. The pair-wise asset correlations are determined from the magnitude of dependence of the credit quality of each asset on the risk factors. Asset value correlation measures the degree to which the asset values co-vary through time. Consumer loans can readily be categorised into asset types and the correlations between these asset types can be obtained. Because historical asset-value time series for consumer obligations are typically not available, the correlation assumptions in VECTOR ABS are expert based. These expert-based numbers, however, were confirmed by inferring asset correlations from historical default information as described in Box 1 below. The data was extracted from Fitch's European consumer ABS performance

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Box 1: Calculating Asset Correlation

To get an estimate of the asset correlation, Fitch utilised a methodology proposed by Schoenbucher ("Credit Derivative Pricing Models"). If historical default data on consumer assets is of good quality and available over a reasonable period of time, one can calculate the cumulative loss distribution for a large granular homogeneous portfolio with a single asset correlation between every pair of assets as follows:

$$F(x) = P(X \leq x) = N\left[\frac{1}{\sqrt{\rho}}(\sqrt{1-\rho}N^{-1}(x) - N^{-1}(\tilde{p}))\right]$$

where p is the default probability and ρ is the asset correlation. The corresponding density function is given by:

$$f(x) = \sqrt{\frac{1-\rho}{\rho}}\exp\left[0.5*(N^{-1}(x))^2 - \frac{1}{2*\rho}(N^{-1}(\tilde{p}) - \sqrt{1-\rho}N^{-1}(x))^2\right]$$

The default data can be used to find those parameters that best describe the historical default data, with the maximum likelihood method that identifies a likelihood function to maximise the parameters to be estimated. The likelihood function for the above distribution is given as:

$$f(x_1; x_2; x_3....x_n \mid \rho, \overline{p}) = \prod_{i=1}^{n}\sqrt{\frac{1-\rho}{\rho}}\exp\left[0.5*(N^{-1}(x_i))^2 - \frac{1}{2*\rho}(N^{-1}(\tilde{p}) - \sqrt{1-\rho}N^{-1}(x_i))^2\right]$$

Where N is the number of years with data available, and x_i the default rates observed in the past years.

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indices, namely "The Fitch European consumer ABS Performance Index", and "Tyre Tracks", both available at the agency's web site. This is very similar to the method used by the Basel committee to infer retail asset correlations.

VECTOR ABS imposes a two-dimensional risk factor structure in addition to a global risk factor that influences every asset in the portfolio. The two dimensions are region and sector. Fitch has defined eight countries for the purpose of regional segmentation, namely Austria, Belgium, France, Germany, Italy, Portugal, Spain, and the UK. Based on portfolio segmentation seen in European consumer ABS transactions, and the analysis of co-movement of these products in Fitch's various ABS performance indices, the agency has defined six sectors to be used in VECTOR ABS:

- unsecured consumer loans;
- auto loans new vehicles;

Table 2: Fitch Correlation Structure

Global Correlation (%)			2
Sector	Correlation (%)	Region	Correlation (%)
Auto Leases (New)	3	Austria	3
Auto Leases (Used)	3	Belgium	3
Auto Loans (New)	3	France	3
Auto Loans (Used)	3	Germany	3
Consumer Loans (Unsec)	4	Italy	3
Other Leases	3	Portugal	3
		Spain	3
		UK	3

Source: Fitch

- auto loans used vehicles;
- auto leases new vehicles;
- auto leases used vehicles; and
- other leases.

A table containing the Fitch correlation assumptions for various sectors and various regions is reproduced above. Each product type presented by an originator will be mapped by Fitch to a single region and a single sector. Regional and sector correlation will be added to a global correlation of 2% applied to all pairs of assets within a portfolio (see Table 3).

Table 3: Global, Regional and Sector Correlation

	(%)
Global	2
Regional	3
Sector	4

Source: Fitch

The actual correlation applied to a specific pair of assets in the simulation will then be the sum of the global correlation; the sector correlation and the regional correlation for this individual pair (see Table 4 below).

VECTOR ABS also offers an alternative framework of "user defined correlations" where the user is allowed to define their own two-dimensional correlation structure.

One can expect to achieve a correlation benefit for portfolios diversified across regions and sectors. For

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European Consumer ABS Rating Criteria: October 2006

example, the correlation between two consumer loans in the same country and same sector would be higher than between a loan and a lease (two different products) in two different countries.

Table 4: Pair-Wise Asset Correlation

Base	Region	Sector	P	P
Different Assets	Same	Same	ρ0 + ρ1 + ρ2	2% + 3% + 4%
Different Assets	Same	Different	ρ0 + ρ1	2% + 3%
Different Assets	Different	Same	ρ0 + ρ2	2% + 4%
Different Assets	Different	Different	P0	2%

Source: Fitch

The over all correlation in the portfolio is expressed by the portfolio correlation level ("PCL"). The PCL is a measure of the average pair-wise correlation in a portfolio. This quantity is computed as an output and is defined by the formula:

$$PCL = \sqrt{\sum_{i=1}^{N}\sum_{j=1}^{N}\left|\rho_{i,j}\right|^2} \Big/ \sqrt{N \times (N-1)} \quad , i \neq j$$

where $\rho_{i,j}$ is the pair-wise correlation between asset i and j and N is the number of assets in the portfolio.

Fitch calculated the PCL for hypothetical portfolios using a base case default probability observed in its various European consumer ABS performance indices. The agency found that the VECTOR ABS correlation assumptions for these default levels matched very closely with correlation assumptions calculated under the Basel II framework.

VECTOR ABS Outputs
VECTOR ABS outputs reflect the portfolio default level and the value at risk for a given credit portfolio and a targeted rating. These outputs are used as an input into Fitch's proprietary ABS cash flow model. The three outputs are defined below. Since the methodological framework behind VECTOR ABS is based on the agency's Default VECTOR model for CDOs, the same terminology is used.

Rating Default Rate ("RDR")
The RDR is the default threshold, expressed as a percentage of the initial portfolio amount, which is assumed not to be exceeded in a specific rating scenario. For example, if the 'AAA' rating scenario for a five-year remaining term portfolio indicated an RDR of 14.5%, this means that with a 'AAA' certainty, the portfolio default level should not exceed 14.5% over a five-year period. The RDR levels are derived from the portfolio default distribution by applying the confidence level to the distribution that reflects the respective rating scenario and the transaction's term. A typical default distribution curve is reproduced below, which shows the RDR levels corresponding to several rating levels.

Rating Recovery Rate ("RRR")
The RRR is the weighted-average recovery rate ("WARR") for all defaults observed in a given rating scenario. During the Monte Carlo simulation in VECTOR ABS, for each defaulted asset the recovery rate in a given rating scenario is recorded. The weighted average of these recovery rates is computed for each scenario. The RRR distribution is then constructed from all scenarios and the RRR is reported at the appropriate confidence levels.

The recovery rate input will be the base-case recovery rate, determined as described in the section *Determination of Recovery Rate*. Scaling factors are applied to recovery levels depending on the level of security in the possession of the issuer. It is assumed that where the issuer has the benefit of security over an asset that can ultimately be repossessed and sold, a higher level of recoveries can be expected than for a receivable which is totally unsecured. If reliance is

Chart 1: Default Distribution (RDR)

Source: Fitch
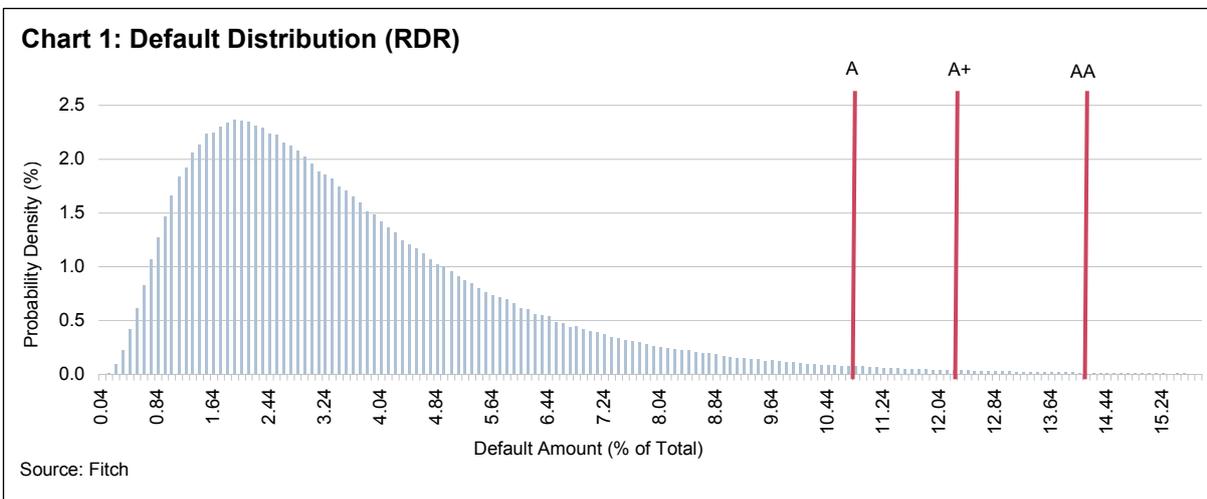
being placed purely on individual borrowers for recoveries, it is assumed that the level of recoveries will be impacted more severely in higher stress scenarios. The scaling applied to recoveries at the different rating levels are as follows:

Table 5: Recovery Rate Scaling

	% of Base Case
Secured Consumer Loans/Leases	
AAA	60
AA	70
A	80
BBB	90
Unsecured Consumer Loans	
AAA	50
AA	60
A	70
BBB	80
Source: Fitch	

It is noteworthy that the RRR is not the same as the WARR often reported in the context of consumer ABS transactions. While the latter simply indicates the weighted average of the recovery rates of the exposures in the portfolio without consideration of which obligations will actually default, the RRR is calculated only on the obligations that have defaulted under the Monte Carlo simulation. It is intuitive that the RRR is of much higher analytical value, since it allows the calculation of a value at risk whereas with a WARR this is only possible in the rare instances where all obligations in the portfolio are assumed to have the same recovery rate.

Rating Loss Rate ("RLR")

The RLR is the loss threshold, expressed as a percentage of the initial portfolio amount that is assumed not to be exceeded in a specific rating scenario. For example, if the 'AAA' rating scenario for a five-year remaining term portfolio indicated a RLR of 8%, this means that with a 'AAA' certainty the portfolio loss level (or the value at risk) should not exceed 8% over a five-year period. The RLR levels are derived from the portfolio loss distribution by applying the confidence level to the distribution that reflects the respective rating scenario and the transaction's term. In a synthetic consumer ABS transaction with no cash flow elements the RLR would be close to the actual credit enhancement suggested by the agency.

Analytical Framework

The general framework of VECTOR ABS is common to nearly all credit risk portfolio models – a multi-risk factor Monte Carlo model that generates the distribution of the portfolio losses by simulating various scenarios.

As explained before, VECTOR ABS provides for a single global risk factor and a set of regional and sector risk factors. Each of these factors is represented by a latent random Gaussian variable and is assumed to be independent of each other. A random draw for each of these factors creates a scenario or "state of the world".

In each scenario, for every asset in the portfolio, Fitch computes an asset value. The value of the asset variable depends partially on the global, regional and sector risk factors and partially upon its own idiosyncratic risk factor (see *Appendix 2* for more details). To determine whether an asset defaults, the agency compares its asset value against a threshold, which is determined exclusively by the asset's probability of default.

If the asset defaults, the outstanding amount of the asset is recorded. The cumulative default of the scenario is then the sum of the amounts outstanding of the defaulted assets. In addition, for each defaulted asset, the model records the recovered amount from which the average recovery rate and ultimately the cumulative loss amount are calculated. Running a large number of simulations then leads to a distribution of the results with regards to cumulative defaults, the WARRs and cumulative losses, from which the RDR, RRR and RLR are derived.

Recent work has shown that the correlation structure described under a Gaussian copula model lacks a way to enhance the correlation in stressed scenarios as is observed in the real world. VECTOR ABS remedies this by introducing a global factor with scenario dependent correlation. The global factor is a risk factor that affects each and every asset in the portfolio and the correlation induced by this factor depends on the scenario chosen. Thus it is possible in the model to emphasise the correlation for stressed scenarios.

■ Cash Flow Modelling

The VECTOR ABS model is applied to analyse the portfolio default and loss level of a given consumer ABS portfolio and hence addresses the asset side of a transaction. Fitch's proprietary consumer ABS cash flow model on the other hand links the cash flows stemming from the assets side with the liability side of a transaction in that it applies the allocation of proceeds generated as per the waterfall set in the transaction's underlying documentation.

Fitch's proprietary consumer ABS cash flow model provides a uniform platform for the analysis of a wide range of transactions and compares their results in a consistent way. The main variables feeding the

cash flow model are defaults and recoveries as determined by VECTOR ABS, the transaction's capital structure, portfolio yield, prepayments, interest and (if applicable) currency movements. While the inputs coming from VECTOR ABS have been stressed within there, the other inputs, except the capital structure, are subject to rating-specific stresses within the cash flow model.

The Fitch cash flow model reflects how the various stress scenarios affect principal and interest proceeds as they are received each period throughout the life of a transaction. The cash flow model then allocates those payments to the various classes of notes based on the transaction structure as detailed in the underlying documents. If the cash flow model shows that a particular class of notes has received principal payment in full and interest payment in time in the stress scenario for a particular rating, then it is deemed to have passed that stress scenario. Passing the cash flow model is one of the key elements for a desired rating.

Fitch models portfolio performance from the commencement of amortisation. If the structure envisages a revolving period, Fitch will review eligibility and portfolio criteria to determine whether and how the portfolio composition can change over time. Together with an assessment of the effectiveness of early amortisation triggers, the agency will then decide if and how it amends the portfolio composition modelled in VECTOR ABS to reflect an expected portfolio quality at the beginning of amortisation (see section: *Analysis of Revolving Transactions* below).

Modelling Assumption

Default and Recovery Timing
The allocation of defaults over time can have a significant impact on an issuer's ability to pay its debt, since the timing of defaults affects the use of excess spread as it flows down the waterfall. The above described base-case default curve (see section: *Determination of Portfolio Quality*) not only delivers a base-case default rate as an input into VECTOR ABS, but also shows a default vector over time, i.e. the increase of the cumulative default rate from origination until maturity. If originator-specific

Table 6: Prepayment Stress Multiples

	Multiples
AAA	1.5
AA	1.4
A	1.3
BBB	1.2
BB	1.1

Source: Fitch

default probabilities have been delivered, Fitch can develop such a term structure of default, which is then used as the default vector over time. In its cash flow model, Fitch will allocate the RDR from VECTOR ABS over the amortisation period of the transaction as described by the default vector.

The same way the allocation of defaults over time affects the allocation of proceeds during a transaction's life, the generation of recovery over time matters. In analogy to cumulative defaults, cumulative recoveries on defaulted obligations show a time vector that is again derived from static pool recovery data as described under *Determination of Portfolio Quality*.

The earlier recoveries come in, the earlier the issuer can pay down its interest bearing debt or purchase new, interest generating receivables, thereby reducing negative carry as a drag to the transaction. Again, Fitch will allocate the RRR from VECTOR ABS over the amortisation period of the transaction as described by the recovery vector.

Prepayments
Prepayment usually occurs either due to a borrower refinancing the existing loan with a more attractive one, or voluntary repayment by the borrower after a change to their financial circumstances. Fitch reviews dynamic prepayment data showing the history of average prepayment across the portfolio. Over time, Fitch expects most prepayments to derive from the higher interest rate loans, shifting the portfolio's average yield downwards.

Fitch models the impact of prepayments on the amortisation of the principal collateral of the portfolio and expects them to reduce the average life of the portfolio, thereby impacting the total interest generated by the portfolio. The base-case annual prepayment rate is stressed under each rating scenario as shown in the table above. Fitch then tests the cash flows for both the stressed and the low prepayment scenarios. The impact of prepayment on yield is modelled indirectly by applying a deduction to yield, as described below. In instances where the originator can demonstrate that there is no positive correlation between yield on the one side and prepayments on the other side, Fitch will take such data into account when applying its prepayment stresses.

Portfolio Yield
Fitch reviews the current yield distribution for an amortising portfolio and the minimum warranted weighted-average ("WA") yield for a revolving transaction. The agency then applies a weighted-average coupon compression ("WACC"), which is

driven by prepayment and delinquency/default stresses as it assumes that:

- higher yielding accounts are more likely to be subject to delinquency, as accounts priced with higher interest are assumed to have less creditworthy borrowers, and are more likely to default.

- higher interest paying accounts are more likely to prepay, as these obligors are more likely to find cheaper funding elsewhere.

The pool interest rate distribution is therefore dynamically adjusted, and a new WA interest rate is calculated at each payment date to reflect the assumed change in the interest rate composition of the then-outstanding portfolio. The total WACC, arising from prepayments, delinquencies and defaults, is stressed under the respective rating scenario as a consequence of the prepayment, delinquency and default rates applied.

For transactions where the initial pool amortises along with the notes, Fitch uses the pool's initial WA yield as a starting point for its cash flow model. For revolving transactions, Fitch normally models yield at the minimum WA yield that the eligibility criteria allow.

Delinquencies
Fitch normally receives either static pool or dynamic delinquency data for a transaction. It looks for a certain consistency between the delinquency and default data. However, a significant upturn in delinquencies observed in the most recent months may indicate a future increase in defaults that has not yet been observed in the historical default data alone. Fitch may, therefore, adjust its base default assumption accordingly. The agency assumes in its cash flow modelling that all loans going into default in the respective rating scenario will have been delinquent for the time until they have been recorded as defaulted, which ties into the default definition as described earlier under *Determination of Portfolio Quality*.

Servicing Fee
Historically, the originator/seller of the receivables contracts in ABS transactions has been contracted as servicer. A range of fees have been seen across consumer transactions. If the fee charged by the original servicer is higher than the market rate, Fitch will assume this higher fee in its cash flow model. However, if the original servicing fee is below market rates, a standard, higher market rate will be assumed to reflect the scenario where the fee

changes after the original servicer is replaced as detailed in the table below.

Table 7: Servicing Fee Assumptions

Rating Category	AAA	AA	A	BBB
Fee Assumption (bps)	100	90	80	70

Source: Fitch

Fitch takes into account current market standard rates for the particular jurisdiction when assessing the servicing fee that would be payable to a back-up servicer. This is then reflected in its cash flow modelling. If a back-up servicer is in place at closing, Fitch will assume the higher of the two fees in its cash flow model. For details regarding back-up servicing, please see *Servicing* section above.

Available Cash Investments
In most ABS transactions, the SPV will hold some cash from principal or interest payments either until the next payment date or until the available amounts are reinvested in other collateral. In particular, in cases where significant amounts of cash are held, the interest earned thereon over time can have an impact on the overall performance of the transaction.

Fitch makes an assumption about the amount of cash on the balance-sheet of the SPV in each period and assumes that interest on this amount is earned at Euribor/Libor minus 0.25%. However, if there is a guaranteed investment contract ("GIC") in place with a suitably rated party at closing, Fitch will apply this in the cash flow model. For Fitch's criteria on eligible investments please see the criteria report "*Counterparty Risk in Structured Finance Transactions: Qualified Investment Criteria*", published on 13 September 2004 and available at the agency's web site at www.fitchratings.com.

Interest Rate and Currency Risks
Interest rate or currency risk arising from a mismatch between the assets that constitute the ABS collateral and the liabilities may leave the issuer exposed to adverse movements in interest or exchange rates. This is typically hedged to a large extent either through matching both assets and liabilities in their composition of different currencies/interest rates ("natural hedge") or through derivatives, primarily swaps, but also caps, floors, forwards and options. Fitch typically looks to see balance guaranteed swaps in place. However, even in this case, interest rate and/or currency exposure may remain if the hedge is adjusted on the balance of the performing loans rather than the notes (as it is often the case).

Fitch stresses interest and currency exchange rates to reflect the required rating category of the notes based

on historical movements in the relevant index to ensure that investors are adequately protected. For Fitch's criteria on swap transactions and the stresses applied please see the criteria reports *"Interest Rate Risk In Structured Finance Transactions: Euribor"*; *"Interest Rate Risk In Structured Finance Transactions: GBP Sterling Libor";* and *"Counterparty Risk in Structured Finance Transactions: Swap Criteria"*, all available at the agency's web site at www.fitchratings.com.

Sources of Credit Enhancement

The primary forms of credit enhancement in consumer ABS are excess spread; reserve accounts funded either upfront, by excess spread or via a subordinated loan; subordination; and overcollateralisation. Not all forms of credit enhancement offer investors the same level of protection. Furthermore, credit enhancement levels may vary among securitisations by the same issuer according to structural and collateral characteristics. The following section outlines how Fitch analyses the most common forms of credit enhancement in consumer ABS.

Excess Spread and Reserve Accounts

Fitch calculates excess spread as portfolio yield less funding costs, servicing and transaction costs, delinquent yield, and defaults. Fitch models the excess spread according to its application in the waterfall, which can be such that it is released to the originator on each payment date when it has not been used to cover defaults or losses ("use it or lose it"), it may fund a reserve account up to a particular level, or it may be used to redeem a particular class of notes. The latter can be such that it redeems a senior note and as such builds additional overcollateralisation, or such that it "turbos" a mezzanine note and reduces the weighted-average cost of capital.

Credit given for excess spread in Fitch's cash flow model is dependent on the different prepayment and default assumptions applied under the various target ratings. Trapping of excess spread during the life of the transaction may occur immediately after closing with the purpose of building a reserve amount. Alternatively, trapping may occur after the breach of a performance trigger with the purpose of building a reserve prior to performance deteriorating to an overall loss-making level. Depending on the projected level of spread performance going forward, Fitch may give credit for immediate trapping of excess spread. However, since it has to be assumed that excess spread diminishes quickly in a stressed scenario, Fitch typically only gives credit for trapping of excess spread over an initial period of six months after closing, which is the time horizon the

agency deems prudent not to assume the emergence of a severe stress.

Most unsecured loan securitisations use spread or reserve accounts, which are typically funded with a subordinated loan, and/or, as above, trap net excess spread up to a required amount. Reserve accounts are used primarily to provide liquidity and cover losses. The initial amount on the reserve account typically dictates the minimum level of losses a securitisation can withstand at closing when the rating is assigned. Most reserve accounts are then sized to reach their target level within six months under base-case loss expectations.

If the reserve account target is reached, a greater amount of credit enhancement is available to cover remaining losses, and the losses the transaction can withstand are significantly greater than they were at day one. As the transaction becomes more seasoned, and the expected period of peak losses passes, it may be possible to release part of the reserve.

Subordination and Overcollateralisation

Senior/subordinated structures are typical in consumer ABS transactions. Here, one or more classes of notes (the junior notes) are subordinated in favour of the senior notes thereby providing the senior tranches with protection against losses. Depending upon the cash flow structure of the transaction, all of the principal and interest on the junior notes or just the principal may be subordinated for the benefit of the senior notes. Effectively, any losses in the transaction that are not covered by excess spread will be suffered by the junior notes first.

Overcollateralisation is where the principal amount of receivables/assets exceeds the principal amount of notes issued. The main difference between subordination and overcollateralisation is that all of the available cash flows from overcollateralisation will be used to support the senior notes if necessary. Conversely, support from subordination will typically be net of the junior note costs unless the structure allows for junior note interest to be subordinated to senior note interest and principal.

Structural Covenants and Waterfall

Priority of Payments

The priority of payments or 'waterfall' of a transaction determines the order in which available funds are allocated at fixed intervals in satisfying the liabilities (interest and principal under the notes) of the issuer. Junior-ranking positions typically receive funds only after amounts due to more senior items for the relevant period have been paid in full.

There may be several priorities of payments in a single transaction, each corresponding to a category of funds (revenue or principal) and/or the status of the deal (e.g. pre- or post-enforcement of the notes).

In *combined waterfall structures* principal and interest collected from the loans are merged and distributed according to one priority of payments. Principal payments to each note class are typically subordinated to payment of interest on the related note tranche.

With *separate waterfalls* principal and interest funds are kept segregated and applied in their own respective waterfalls. In both cases it is possible to use interest to cover principal shortfalls and principal may also be used to cover interest.

Fitch has also seen structures where underperformance of the assets will trigger a change in the order in which interest is paid on the notes.

Principal Deficiency Ledger
During the life of the transaction, principal receivables are used either to purchase new receivables in the revolving period or to pay down the notes in the amortisation phase. In the absence of defaults, total asset balance should always equal total liability balance. However, when defaults occur, principal collections are insufficient to maintain this equilibrium (assuming there are no additional receivables by way of overcollateralisation in the transaction).

The amount of these principal losses is often debited on an ongoing basis (i.e. once for each reporting period) to a ledger account being generally referred to as principal deficiency ledger ("PDL"). Amounts standing to this PDL are then cleared by crediting excess spread, payments from overcollateralisation or recovery proceeds to the ledger. If excess spread, overcollateralisation or recoveries are insufficient to clear the account in full, losses will be allocated against the notes on their final maturity date starting with the most junior tranche. If excess spread or recoveries subsequently become available again, they may be used to reduce the outstanding PDL before the final maturity date and therefore avoid a loss allocation to the notes.

Fitch reflects the individual transaction specifics relating to charge off timing and provisioning to cover PDLs into its cash flow analysis.

Pro Rata Amortisation
Pro rata, as opposed to sequential, amortisation refers to the allocation of available principal funds to redeem the senior and junior notes proportionally in accordance with their respective outstanding balance.

As a result of sequential pay-down, credit enhancement as a percentage of notes outstanding increases over time but remains the same in absolute terms. With pro rata amortisation, credit enhancement remains the same as a percentage of notes outstanding and decreases in absolute terms.

Pro rata allocation of proceeds and hence a constant capital structure over time make a transaction much more sensitive to volatile default vectors. This means that when the defaults are more back loaded than originally assumed, available credit enhancement might not be sufficient to cover these losses. Also, a pro rata allocation of unscheduled principal payments under the loans or leases (prepayments) raises the risk of "adverse selection": better credits will prepay first, leading to a deterioration of credit quality in the portfolio.

For the issuer, pro rata amortisation has the benefit that the weighted-average cost of funding remains constant over the life of the transaction, which also has a stabilising effect on the level of excess spread (although it could still decline due to WACC). By contrast, under sequential pay-down structures that retire senior notes first, the weighted-average cost of funding rises over time as the proportion of more expensive junior notes increases. The level of excess spread therefore declines for a sequential structure as time goes on.

In recognition of the greater credit risks associated with pro rata pay-down, Fitch prefers that a period of sequential pay-down takes place from closing to allow a certain percentage increase in credit enhancement prior to pro rata amortisation commencing. In addition, Fitch would expect to see certain other mitigants in respect of pro rata amortisation; for example, if there is a PDL debit balance, an outstanding draw on the reserve fund or a material increase in delinquency levels (all of which are indicators of deteriorating credit quality) allocation of principal funds should revert to sequential.

■ Analysis of Revolving Transactions
Many consumer ABS loan and lease transactions contain a revolving period that is typically for a period of between two and five years. During the revolving period, noteholders will receive interest only and principal is utilised to purchase new receivables. The life of the transaction is therefore extended. At the end of the revolving period, principal receipts will be used to amortise the transaction and pay down the noteholders.

During the revolving period, it is key to ensure that the quality of the portfolio is kept as closely in line

as possible with the original pool upon which the analysis was based. There are various ways to protect the profile of the pool during the revolving period:

Eligibility and Portfolio Criteria

Strict eligibility and portfolio criteria are employed to ensure that purchases by the issuer are consistent with the original pool. Typical eligibility criteria for consumer loan and lease ABS transactions will include the following, some of which will only be applicable for auto transactions:

- Originated in line with the originator's underwriting guidelines;
- no delinquent or written off/charged-off contracts;
- maximum loan/lease tenor;
- compliance with applicable consumer finance legislation and enforceable;
- maximum single obligor concentration limits;
- minimum weighted-average interest rate;
- percentage of new versus used cars;
- minimum interest weight or spread for each loan in the pool;
- maximum original maturity for every contract;
- geographical constraints;
- maximum RV or balloon per contract, by portfolio or sub-pool; and
- RV/Balloon cap for the portfolio or sub-pool.

Fitch will use portfolio covenants as an input into VECTOR ABS and into its proprietary cash flow model to make an assumption on how the credit quality of the portfolio could deteriorate towards the end of the revolving period. For instance, the agency would assume the share of these products to be maximised as per the portfolio criteria for which it assigned the highest base-case default rate or the lowest base-case recovery rate. The same applies with regard to assumptions being made on the cash flow side such as, for instance, the weighted-average yield on the portfolio.

Triggers

During the revolving period, the performance of the pool must be monitored to ensure that it does not deviate significantly from historical performance seen at the time of rating the transaction. Fitch therefore looks for performance and other triggers (which if breached will trigger an early amortisation of the transaction) to ensure that performance is consistent with original assumptions made when calculating credit enhancement levels and investors are therefore adequately protected. Typical triggers include the following:

- A maximum threshold of delinquency and defaults.
- Negative excess spread or a minimum threshold of yield.
- No uncleared entry on the PDL.
- No drawings on the cash reserve.

When setting delinquency and default triggers, Fitch is looking for the performance to be kept closely in line with that seen at the time of rating the transaction whilst recognising that performance will be subject to some fluctuations. Triggers are set by reference to Fitch's base-case assumption which is derived from the historical performance of the portfolio at close. This addresses the concern that if performance deviates too far from the base case, credit enhancement will not be sufficient when the transaction starts to amortise. When evaluating a default trigger, Fitch will also take into account the transaction's capital structure and the forms of credit enhancement available. If the trigger is adjusted on an annual basis, it should be set to follow the default vector determined from historical data. New purchases that occur during the revolving period are taken into account and added into the denominator for the calculation of cumulative defaults. However, additions will be subject to a time lag depending upon the definition of default to take account of the time it takes for new receivables to roll through the delinquency buckets prior to default.

■ Legal Issues

Fitch will review the transaction documents in connection with the transaction and expect to receive for its review legal opinions and, where appropriate, memoranda identifying all significant legal risks in the transaction. Without limiting what may be relevant in any particular jurisdiction, typically, these will include the following:

Consumer Finance Contract

In relation to the form of consumer finance contract that generates the receivables, Fitch expects to receive legal opinions that:

- confirm that (based on appropriate factual assumptions) a contract entered into using the form of contract will be legal, valid, binding and enforceable including, under the relevant consumer credit and other applicable consumer laws that govern its formation;

- analyse whether any legal right exists for the consumer to exercise set-off rights against the lender in respect of the consumer finance contract;

- analyse whether there is any potential lender liability in respect of the consumer finance contract under applicable consumer laws, for example for lender's liability (whether several, or jointly with the supplier) for goods or services purchased under the consumer finance contract or for untrue or incorrect representations made by brokers or suppliers of goods or services financed by the consumer finance contract; and

- identify whether the consumer finance contract can be affected by any applicable usury laws.

In addition, where the consumer laws prescribe that the validity or enforceability of the consumer finance contract can be affected by any failure of the originator to comply with specific procedures or formalities when forming the contract, Fitch will expect diligence memoranda that confirm compliance by the originator with these specific procedures or formalities.

Transaction Opinions

In relation to the transaction, Fitch would typically expect the following issues to be addressed in the legal opinions:

- The SPV has been duly incorporated (or established) and exists, and, where relevant, it has good standing and it has the power and capacity to enter into and perform its obligations under the transaction documents.

- The transaction documents are legal, valid, binding and enforceable against the SPV and all other transaction parties relevant to the ratings analysis. The opinions should cover both the law chosen to govern the transaction documents and the laws of any other relevant jurisdictions where the transaction documents are to be enforced; for example, jurisdictions where relevant parties are established or where assets are located. In addition, any local legal, regulatory or tax requirements or consequences that affect the SPV in the place where it is established, should be identified. (See also Fitch's structured finance criteria report, *"Special –Purpose Vehicles in Structured Finance Transactions"* dated 13 June 2006.)

- There has been a "true sale" or other mechanism to transfer title to the receivables (and all other securitised assets, for example, where the RV of assets is being financed) from the originator/seller to the SPV in a way that mitigates as much as possible the ability of the originator (or any creditor or bankruptcy official

appointed to the originator) to overturn the sale and claw-back the receivables. Typically, Fitch will expect this analysis to include a bankruptcy analysis of the originator/seller (in respect of the true sale/other mechanism) and the SPV (in respect of the security it grants over the receivables and other securitised assets to the transaction creditors). Where the securitised asset is the RV of assets (rather than a receivable), Fitch will expect to receive a legal opinion in respect of the transfer of title to the assets whose RV is being securitised, particularly in structures in which transfer of title does not occur at the outset of the securitisation, but is triggered at a future date (for example, on expiry of a hire-purchase or lease contract). If the SPV takes title to physical assets, Fitch would also expect the legal opinion to identify and analyse the risks (if any) of the SPV holding legal title to those assets.

- The transaction creditors (through the security trustee) have been granted legal, valid, binding and enforceable first-ranking security by the SPV over the receivables and other assets acquired.

- The existence of any tax liabilities that can affect the cash flows in the transaction have been identified.

- In respect of any trusts in the structure, they are validly established and the trust assets will not be assets available to the general creditors of the trustee in the event of the trustee's insolvency.

■ Performance Analytics and Reporting Standards

The ongoing performance analysis of transactions forms an essential part of the Fitch rating process. A dedicated team handles the ongoing monitoring and review of Fitch-rated consumer ABS transactions by assessing whether the transactions are performing as expected. Each Fitch-rated transaction is reviewed at least once per year resulting in a rating action, i.e. an upgrade; downgrade; affirmation; and/or Rating Watch. Such rating action for a public rating is announced via appropriate commentary on the Fitch website, a press release and a Performance Update report, as applicable. Privately-rated transactions are reviewed internally to the same rigorous standards as public transactions.

Fitch's ongoing surveillance includes the review of periodic performance information provided by servicers and trustees. The agency publishes relevant information for publicly-rated ABS, such as pool size, delinquency and default rates as well as

principal and interest payment on the notes on Fitch's subscription website under the *Surveillance* section at www.fitchresearch.com. Among many factors, Fitch also monitors the effects of any change in the ratings of entities on which the ABS is credit-dependent, such as for swap counterparties and banks holding certain transaction accounts.

Post Issuance Reporting Standards

Fitch has published its preferred post-issuance reporting standards for consumer ABS transactions in the report *"European Consumer ABS Reporting Standards (Vol II): Auto Contracts and Unsecured Consumer Loans"*, dated 22 April 2004. This report intends to set a pro forma standard for all new and existing true sale and synthetic transactions within this market segment. Many of the key performance attributes for such assets are identical and where they differ the report distinguishes the particularities for each asset type. The report also summarises Fitch's review process for all consumer ABS transactions.

Fitch introduced an objective, transparent system for grading the quality of post-issuance performance reporting, consisting of the Fitch Issuer Report Grades ("IRGs"), as described in the reports *"Fitch Issuer Report Grades"*, dated 5 June 2006 and *"Issuer Report Grades Special Report"*, dated 25 November 2004. IRGs are designed to identify and hold up good practice in reporting, while encouraging improvement in the standards of issuer reports that do not currently achieve high IRGs. The performance analytics team assigns IRGs to each issuer and these are updated every year with each performance review. IRGs are awarded on a 1-5 scale with 1 being the lowest. The scoring system measures the asset and liability side of the report. It also scores for the timeliness and user convenience of the reports. Scoring is based on information provided to investors only. IRGs are published bi-annually and they are shown on the surveillance record on the subscription website.

When assessing performance, Fitch considers several factors, including a comparison between expected defaults and actual defaults over time as well as the actual loss on the pool. Other analytical steps include the analysis of initial and current credit enhancement levels and the analysis of all variables that may trigger early amortisation (other than defaults and delinquencies) such as net excess spread.

Performance Indices

Fitch publishes several indices in Europe, tracking the relative performance of transactions within specific groups, including *"Tyre Tracks - Fitch European Auto ABS Index"*, *"Eye On Europe: The Fitch European Consumer ABS Performance Index"*, and *"Fitch Italian Leasing Performance Index"*. Tyre Tracks is a quarterly report that focuses on Fitch-rated European auto ABS. This report includes five indices tracking the performance of delinquencies, net losses and excess spread together with an overview of transaction performance and a range of market statistics. Eye on Europe refers to Fitch's semi-annual European performance index, which applies to all consumer ABS, notably securitisations of auto contracts, credit card receivables and unsecured consumer loans. The index includes dynamic indices on delinquency, losses and excess spread and also tracks ABS performance against the movement of certain macroeconomic indicators. The Italian Leasing Performance Index discusses performance Italian Leasing deals on a regular basis. All three index reports are available at the agency's web site at www.fitchratings.com.

■ Appendix 1: Calculation of Base Cases

The analysis below describes how Fitch constructs a static cumulative default rate table, and the extrapolations of default rates for recently originated vintages. The same methodology is also applicable to the calculation of cumulative base-case recovery rate assumptions, except that the agency would not apply extrapolation. How the agency calculates adjustments for seasoning is also described further down in this appendix.

Defaults are defined as the point in time post delinquency when the originator has demanded full repayment of the loan and has classified it as defaulted. This point in time shall be reflected in the definition of default as described in the section *Determination of Portfolio Quality*. The default definition will differ from originator to originator.

Cumulative Default Rates

Table 8 below is an example of vintage data provided to the agency by an originator. The table presents defaults as per the chosen default definition for each quarter since the origination of a vintage. For example, the Q403 vintage has actual defaults of 6,384 two quarters after origination.

Table 8: Actual Default Amounts per Quarter

Vintages	Origination Amount	Quarters Since Origination																				
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Q101	612,000	623	2,853	3,462	4,658	5,200	3,618	1,670	2,780	1,797	1,886	427	599	1,488	671	532	650	103	113	81	306	662
Q201	700,000	613	3,875	2,440	5,476	5,664	3,117	3,061	1,254	2,603	1,867	273	1,015	1,833	648	1,051	571	161	146	964	586	
Q301	732,490	937	4,197	6,089	4,034	3,760	3,540	1,478	3,400	573	3,635	393	1,424	986	1,561	470	93	578	355	117		
Q401	793,984	1,807	4,908	7,017	3,640	4,205	4,724	3,801	1,360	3,451	2,056	970	1,116	1,682	614	1,248	83	946	599			
Q102	834,563	1,842	4,283	4,546	5,136	7,315	2,867	2,817	3,082	768	3,843	627	1,540	1,825	1,904	223	347	117				
Q202	904,485	1,277	4,614	7,222	6,555	4,898	4,367	5,542	2,421	2,749	455	957	3,380	1,480	259	390	317					
Q302	953,534	978	5,797	6,798	5,303	5,408	5,646	5,441	4,204	2,525	2,455	561	1,515	555	811	2,011						
Q402	980,124	1,249	5,000	4,803	4,679	3,652	2,466	4,726	3,154	2,631	3,680	877	496	505	2,098							
Q103	1,202,324	2,157	6,105	5,493	9,745	5,652	1,598	5,094	2,048	6,255	69	945	2,914	1,203								
Q203	1,014,485	1,643	4,296	8,163	5,137	3,378	3,525	3,485	5,447	2,236	626	1,285	1,217									
Q303	1,171,731	1,751	5,222	6,892	5,528	3,706	5,558	7,791	465	3,013	1,086	3,583										
Q403	1,312,338	1,674	6,384	6,826	4,039	8,733	2,957	6,840	271	1,790	557											
Q104	1,509,189	2,342	6,505	8,365	4,728	4,463	3,588	5,650	1,651	2,446												
Q204	1,569,557	2,013	7,018	8,046	5,775	6,169	5,403	1,365	2,522													
Q304	1,545,922	2,218	6,763	6,338	6,146	5,201	3,816	3,173														
Q404	1,514,485	2,690	6,859	4,643	7,972	5,212	431															
Q105	1,574,685	2,572	6,044	7,784	6,356	4,269																
Q205	1,578,485	1,526	4,542	5,541	2,602																	
Q305	1,501,234	924	5,679	3,063																		
Q405	1,472,187	964	5,091																			
Q106	1,459,861	1,198																				

Source: Fitch

Cumulative defaults for each vintage for each quarter since origination are calculated simply by adding all of the actual defaults up to the quarter. For example, the Q403 vintage has cumulative defaults of 18,923 four quarters after origination, which is the sum of 1,674, 6,384. 6,826 and 4,039. Table 9 below is the cumulative default table based on Table 8 above.

Table 9: Cumulative Default Amounts per Quarter

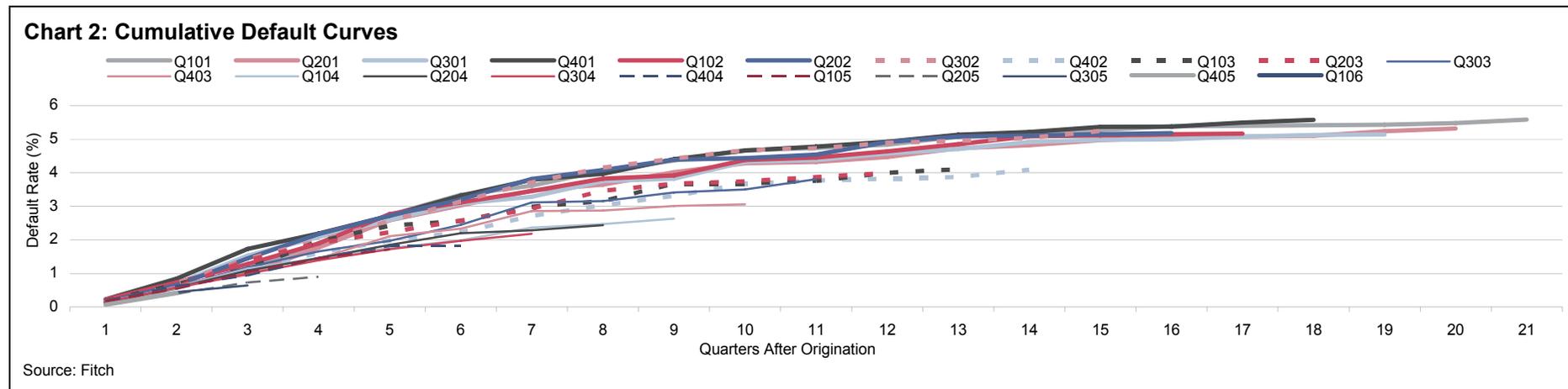| Vintages	Origination Amount	Quarters Since Origination																				
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Q101	612,000	623	3,476	6,938	11,596	16,796	20,414	22,084	24,864	26,661	28,547	28,974	29,573	31,061	31,732	32,264	32,914	33,017	33,130	33,211	33,517	34,179
Q201	700,000	613	4,488	6,928	12,404	18,068	21,185	24,246	25,500	28,103	29,970	30,243	31,258	33,091	33,739	34,790	35,361	35,522	35,668	36,632	37,218	
Q301	732,490	937	5,134	11,223	15,257	19,017	22,557	24,035	27,435	28,008	31,643	32,036	33,460	34,446	36,007	36,477	36,570	37,148	37,503	37,620		
Q401	793,984	1,807	6,715	13,732	17,372	21,577	26,301	30,102	31,462	34,913	36,969	37,939	39,055	40,737	41,351	42,599	42,682	43,628	44,227			
Q102	834,563	1,842	6,125	10,671	15,807	23,122	25,989	28,806	31,888	32,656	36,499	37,126	38,666	40,491	42,395	42,618	42,965	43,082				
Q202	904,485	1,277	5,891	13,113	19,668	24,566	28,933	34,475	36,896	39,645	40,100	41,057	44,437	45,917	46,176	46,566	46,883					
Q302	953,534	978	6,775	13,573	18,876	24,284	29,930	35,371	39,575	42,100	44,555	45,116	46,631	47,186	47,997	50,008						
Q402	980,124	1,249	6,249	11,052	15,731	19,383	21,849	26,575	29,729	32,360	36,040	36,917	37,413	37,918	40,016							
Q103	1,202,324	2,157	8,262	13,755	23,500	29,152	30,750	35,844	37,892	44,147	44,216	45,161	48,075	49,278								
Q203	1,014,485	1,643	5,939	14,102	19,239	22,617	26,142	29,627	35,074	37,310	37,936	39,221	40,438									
Q303	1,171,731	1,751	6,973	13,865	19,393	23,099	28,657	36,448	36,913	39,926	41,012	44,595										
Q403	1,312,338	1,674	8,058	14,884	18,923	27,656	30,613	37,453	37,724	39,514	40,071											
Q104	1,509,189	2,342	8,847	17,212	21,940	26,403	29,991	35,641	37,292	39,738												
Q204	1,569,557	2,013	9,031	17,077	22,852	29,021	34,424	35,789	38,311													
Q304	1,545,922	2,218	8,981	15,319	21,465	26,666	30,482	33,655														
Q404	1,514,485	2,690	9,549	14,192	22,164	27,376	27,807															
Q105	1,574,685	2,572	8,616	16,400	22,756	27,025																
Q205	1,578,485	1,526	6,068	11,609	14,211																	
Q305	1,501,234	924	6,603	9,666																		
Q405	1,472,187	964	6,055																			
Q106	1,459,861	1,198																				

Source: Fitch

The cumulative default rate is calculated by dividing the cumulative defaults by the origination amount for each quarter (see Table 10 below) expressed as a percentage. The resulting rates are plotted in Chart 2 below.

Table 10: Static Cumulative Default Rates (%)

Vintages	Origination Amount	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
										Quarters Since Origination												
Q101	612,000	0.10	0.57	1.13	1.89	2.74	3.34	3.61	4.06	4.36	4.66	4.73	4.83	5.08	5.18	5.27	5.38	5.39	5.41	5.43	5.48	5.58
Q201	700,000	0.09	0.64	0.99	1.77	2.58	3.03	3.46	3.64	4.01	4.28	4.32	4.47	4.73	4.82	4.97	5.05	5.07	5.10	5.23	5.32	
Q301	732,490	0.13	0.70	1.53	2.08	2.60	3.08	3.28	3.75	3.82	4.32	4.37	4.57	4.70	4.92	4.98	4.99	5.07	5.12	5.14		
Q401	793,984	0.23	0.85	1.73	2.19	2.72	3.31	3.79	3.96	4.40	4.66	4.78	4.92	5.13	5.21	5.37	5.38	5.49	5.57			
Q102	834,563	0.22	0.73	1.28	1.89	2.77	3.11	3.45	3.82	3.91	4.37	4.45	4.63	4.85	5.08	5.11	5.15	5.16				
Q202	904,485	0.14	0.65	1.45	2.17	2.72	3.20	3.81	4.08	4.38	4.43	4.54	4.91	5.08	5.11	5.15	5.18					
Q302	953,534	0.10	0.71	1.42	1.98	2.55	3.14	3.71	4.15	4.42	4.67	4.73	4.89	4.95	5.03	5.24						
Q402	980,124	0.13	0.64	1.13	1.61	1.98	2.23	2.71	3.03	3.30	3.68	3.77	3.82	3.87	4.08							
Q103	1,202,324	0.18	0.69	1.14	1.95	2.42	2.56	2.98	3.15	3.67	3.68	3.76	4.00	4.10								
Q203	1,014,485	0.16	0.59	1.39	1.90	2.23	2.58	2.92	3.46	3.68	3.74	3.87	3.99									
Q303	1,171,731	0.15	0.60	1.18	1.66	1.97	2.45	3.11	3.15	3.41	3.50	3.81										
Q403	1,312,338	0.13	0.61	1.13	1.44	2.11	2.33	2.85	2.87	3.01	3.05											
Q104	1,509,189	0.16	0.59	1.14	1.45	1.75	1.99	2.36	2.47	2.63												
Q204	1,569,557	0.13	0.58	1.09	1.46	1.85	2.19	2.28	2.44													
Q304	1,545,922	0.14	0.58	0.99	1.39	1.72	1.97	2.18														
Q404	1,514,485	0.18	0.63	0.94	1.46	1.81	1.84															
Q105	1,574,685	0.16	0.55	1.04	1.45	1.72																
Q205	1,578,485	0.10	0.38	0.74	0.90																	
Q305	1,501,234	0.06	0.44	0.64																		
Q405	1,472,187	0.07	0.41																			
Q106	1,459,861	0.08																				

Source: Fitch

Chart 2: Cumulative Default Curves

Q101 Q201 Q301 Q401 Q102 Q202 Q302 Q402 Q103 Q203 Q303
Q403 Q104 Q204 Q304 Q404 Q105 Q205 Q305 Q405 Q106

Default Rate (%)

Quarters After Origination

Source: Fitch

European Consumer ABS Rating Criteria: October 2006

Extrapolation of Cumulative Default Rates

To extrapolate a default rate for more recently originated vintages, gradient factors are calculated for each vintage and quarter since origination. An average gradient factor is then calculated with which the cumulative default rates are extrapolated.

The gradient factors for Table 11 are depicted below. The gradient factor for each vintage and each quarter since origination is calculated by dividing the subsequent quarter's defaults by the preceding quarter's defaults. For example, the gradient factor for vintage Q403 from two quarters after origination to three quarters after origination is 1.13 / 0.61 = 1.85. It should be noted that the agency will apply extrapolation with consideration in situations where the defaults rates observed for the most recent vintages differ significantly from early defaults in previous vintages.

Table 11: Gradient Factors

| Vintages	Origination Amount	Quarters Since Origination																				
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Q101	612,000		5.58	2.00	1.67	1.45	1.22	1.08	1.13	1.07	1.07	1.01	1.02	1.05	1.02	1.02	1.02	1.00	1.00	1.00	1.01	1.02
Q201	700,000		7.32	1.54	1.79	1.46	1.17	1.14	1.05	1.10	1.07	1.01	1.03	1.06	1.02	1.03	1.02	1.00	1.00	1.03	1.02	
Q301	732,490		5.48	2.19	1.36	1.25	1.19	1.07	1.14	1.02	1.13	1.01	1.04	1.03	1.05	1.01	1.00	1.02	1.01	1.00		
Q401	793,984		3.72	2.04	1.27	1.24	1.22	1.14	1.05	1.11	1.06	1.03	1.03	1.04	1.02	1.03	1.00	1.02	1.01			
Q102	834,563		3.33	1.74	1.48	1.46	1.12	1.11	1.11	1.02	1.12	1.02	1.04	1.05	1.05	1.01	1.01	1.00				
Q202	904,485		4.61	2.23	1.50	1.25	1.18	1.19	1.07	1.07	1.01	1.02	1.08	1.03	1.01	1.01	1.01					
Q302	953,534		6.93	2.00	1.39	1.29	1.23	1.18	1.12	1.06	1.06	1.01	1.03	1.01	1.02	1.04						
Q402	980,124		5.00	1.77	1.42	1.23	1.13	1.22	1.12	1.09	1.11	1.02	1.01	1.01	1.06							
Q103	1,202,324		3.83	1.66	1.71	1.24	1.05	1.17	1.06	1.17	1.00	1.02	1.06	1.03								
Q203	1,014,485		3.61	2.37	1.36	1.18	1.16	1.13	1.18	1.06	1.02	1.03	1.03									
Q303	1,171,731		3.98	1.99	1.40	1.19	1.24	1.27	1.01	1.08	1.03	1.09										
Q403	1,312,338		4.81	1.85	1.27	1.46	1.11	1.22	1.01	1.05	1.01											
Q104	1,509,189		3.78	1.95	1.27	1.20	1.14	1.19	1.05	1.07												
Q204	1,569,557		4.49	1.89	1.34	1.27	1.19	1.04	1.07													
Q304	1,545,922		4.05	1.71	1.40	1.24	1.14	1.10														
Q404	1,514,485		3.55	1.49	1.56	1.24	1.02															
Q105	1,574,685		3.35	1.90	1.39	1.19																
Q205	1,578,485		3.98	1.91	1.22																	
Q305	1,501,234		7.15	1.46																		
Q405	1,472,187		6.28																			
Q106	1,459,861																					
Average Gradient Factors			**4.74**	**1.88**	**1.43**	**1.28**	**1.16**	**1.15**	**1.08**	**1.08**	**1.06**	**1.03**	**1.04**	**1.03**	**1.03**	**1.02**	**1.01**	**1.01**	**1.01**	**1.01**	**1.01**	**1.02**

Source: Fitch

Once all gradient factors have been calculated, they are averaged across all vintages for a specific quarter after origination. In the example above, the average gradient factor for all vintages three quarters after origination is 1.88. The average gradient factors calculated for each quarter after origination is used to extrapolate the cumulative default rates.

Table 12 below presents the results of the extrapolated default rates. The extrapolated default rate for the next quarter is calculated by multiplying this quarter's default rate by the average gradient factor for next quarter. For the Q205 vintage, to extrapolate the default rate from four quarters to five quarters after origination, Fitch multiplies 0.9% with the average gradient factor of 1.29 to get 1.16%. Note that for the Q106 vintage, the agency could not calculate the extrapolated default rates due to lack of data. Chart 3 below plots the extrapolated cumulative default curves.

Table 12: Extrapolated Cumulative Default Rates (%)

Vintages	Origination Amount	Quarters Since Origination																				
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Q101	612,000	0.10	0.57	1.13	1.89	2.74	3.34	3.61	4.06	4.36	4.66	4.73	4.83	5.08	5.18	5.27	5.38	5.39	5.41	5.43	5.48	5.58
Q201	700,000	0.09	0.64	0.99	1.77	2.58	3.03	3.46	3.64	4.01	4.28	4.32	4.47	4.73	4.82	4.97	5.05	5.07	5.10	5.23	5.32	5.42
Q301	732,490	0.13	0.70	1.53	2.08	2.60	3.08	3.28	3.75	3.82	4.32	4.37	4.57	4.70	4.92	4.98	4.99	5.07	5.12	5.14	5.20	5.30
Q401	793,984	0.23	0.85	1.73	2.19	2.72	3.31	3.79	3.96	4.40	4.66	4.78	4.92	5.13	5.21	5.37	5.38	5.49	5.57	5.63	5.70	5.81
Q102	834,563	0.22	0.73	1.28	1.89	2.77	3.11	3.45	3.82	3.91	4.37	4.45	4.63	4.85	5.08	5.11	5.15	5.16	5.20	5.26	5.32	5.43
Q202	904,485	0.14	0.65	1.45	2.17	2.72	3.20	3.81	4.08	4.38	4.43	4.54	4.91	5.08	5.11	5.15	5.18	5.23	5.27	5.33	5.40	5.50
Q302	953,534	0.10	0.71	1.42	1.98	2.55	3.14	3.71	4.15	4.42	4.67	4.73	4.89	4.95	5.03	5.24	5.29	5.34	5.39	5.44	5.51	5.62
Q402	980,124	0.13	0.64	1.13	1.61	1.98	2.23	2.71	3.03	3.30	3.68	3.77	3.82	3.87	4.08	4.17	4.21	4.25	4.28	4.33	4.38	4.47
Q103	1,202,324	0.18	0.69	1.14	1.95	2.42	2.56	2.98	3.15	3.67	3.68	3.76	4.00	4.10	4.21	4.30	4.34	4.39	4.42	4.47	4.52	4.61
Q203	1,014,485	0.16	0.59	1.39	1.90	2.23	2.58	2.92	3.46	3.68	3.74	3.87	3.99	4.12	4.24	4.33	4.37	4.41	4.45	4.50	4.55	4.64
Q303	1,171,731	0.15	0.60	1.18	1.66	1.97	2.45	3.11	3.15	3.41	3.50	3.81	3.96	4.09	4.21	4.30	4.34	4.38	4.41	4.46	4.52	4.61
Q403	1,312,338	0.13	0.61	1.13	1.44	2.11	2.33	2.85	2.87	3.01	3.05	3.13	3.26	3.37	3.46	3.54	3.57	3.60	3.63	3.67	3.72	3.79
Q104	1,509,189	0.16	0.59	1.14	1.45	1.75	1.99	2.36	2.47	2.63	2.78	2.86	2.97	3.07	3.16	3.22	3.25	3.29	3.31	3.35	3.39	3.46
Q204	1,569,557	0.13	0.58	1.09	1.46	1.85	2.19	2.28	2.44	2.62	2.77	2.85	2.96	3.06	3.15	3.21	3.24	3.28	3.30	3.34	3.38	3.45
Q304	1,545,922	0.14	0.58	0.99	1.39	1.72	1.97	2.18	2.36	2.53	2.68	2.75	2.86	2.96	3.04	3.10	3.13	3.16	3.19	3.22	3.26	3.33
Q404	1,514,485	0.18	0.63	0.94	1.46	1.81	1.84	2.11	2.29	2.46	2.60	2.67	2.77	2.87	2.95	3.01	3.04	3.07	3.09	3.13	3.17	3.23
Q105	1,574,685	0.16	0.55	1.04	1.45	1.72	1.98	2.28	2.47	2.66	2.81	2.88	3.00	3.10	3.19	3.25	3.28	3.32	3.34	3.38	3.42	3.49
Q205	1,578,485	0.10	0.38	0.74	0.90	1.16	1.34	1.54	1.66	1.79	1.89	1.94	2.02	2.09	2.15	2.19	2.21	2.23	2.25	2.28	2.30	2.35
Q305	1,501,234	0.06	0.44	0.64	0.92	1.19	1.37	1.58	1.71	1.84	1.94	1.99	2.07	2.14	2.20	2.25	2.27	2.29	2.31	2.33	2.36	2.41
Q405	1,472,187	0.07	0.41	0.77	1.11	1.42	1.64	1.89	2.05	2.20	2.33	2.39	2.48	2.57	2.64	2.70	2.72	2.75	2.77	2.80	2.84	2.89

Source: Fitch

Chart 3: Extrapolated Default Rates

Source: Fitch
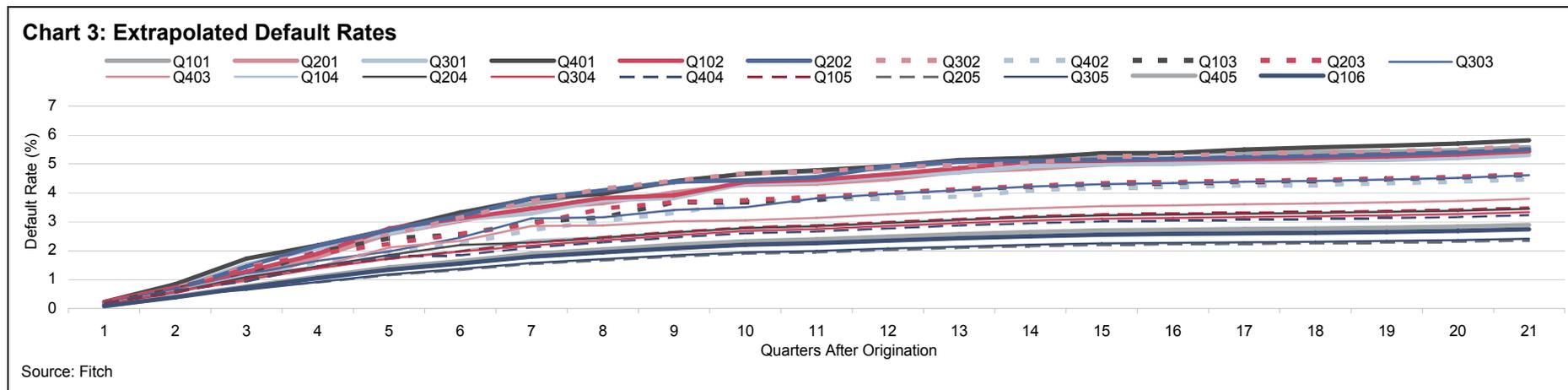
Whilst Fitch typically uses the average gradient factor when extrapolating default data, the agency reserves the right to make adjustments to gradient factors and default rates based on magnitude and direction of default rate trends.

Adjustments for Seasoning

If presented with a well-seasoned pool, Fitch may make an adjustment to the default rates based on the remaining losses as a percentage of the outstanding pool. Adjustment is not typically made where transactions have a revolving period, unless the eligibility criteria include a requirement that receivables are a minimum number of months seasoned. The formula used to make the adjustment is seasoning adjusted base-case default rate = (unadjusted base-case default rate – cumulative default rate to end of seasoning) x (initial amount / outstanding amount).

Specifically, assume that the portfolio has two quarters seasoning and the horizon for Fitch's analysis is 10 quarters. If the Q10 default rate is approximately 1.75% while the Q2 default rate is approximately 0.2% and if the initial balance of the pool was 100 and is 95 at Q2, the seasoning adjusted default rate is:

(1.75% - 0.2%) x (100/95) = 1.63%

This reflects the fact that the portfolio amortises more slowly than the defaults accumulate compared to the cumulative base case. 10% of the losses have been incurred while 5% of the pool has amortised. If, on the other hand, 20% of the pool had amortised the formula would be:

(1.75% - 0.2%) x (100/80) = 1.94%

The chart below depicts a slow amortisation of the portfolio in relation to the speed of losses coming in, with the exception of the first two periods. At the point of seasoning where the sale of the assets is perfected to the issuer, if the amortisation line is above the default line a seasoning benefit will occur; however, if the reverse is true, losses as a percentage of the remaining portfolio will be higher than the base-case cumulative loss assumption.

Chart 4: Loss Vector vs Amortisation

Loan Amortisation (LHS) ——— Cumulative Default (RHS)

Source: Fitch
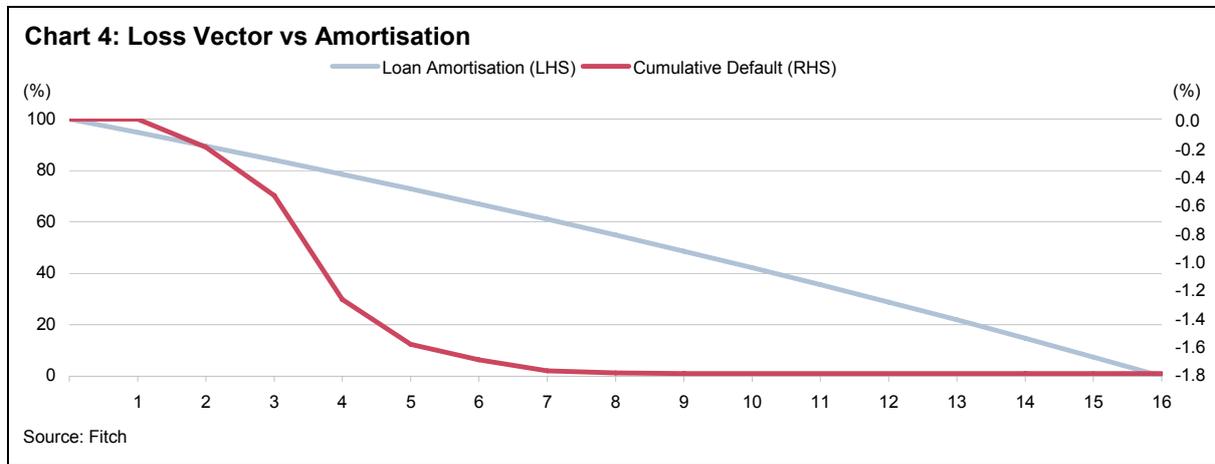
■ **Appendix 2: Simulation Methodology**

The Monte Carlo simulation methodology is described below. Fitch's starting point is the definition of the risk factor latent variables. Each of these is a zero mean unit variance Gaussian random variable. The agency defines a single global factor and denotes it by F^G. In addition, Fitch defines eight regional risk factors corresponding to each of the countries and six sector risk factors corresponding to the Fitch sectors and denotes these respectively by F_i^R and F_j^S, where i and j are index variables that describe the region and sector numbers, respectively. The Monte Carlo simulation is simply a collection of a large number of scenarios. Each scenario is a "state-of-the-world" represented by a random draw of the random variables F^G, F_i^R and F_j^S.

Fitch now defines the individual asset's idiosyncratic factor to be F_k^I, which is also a zero mean unit variance Gaussian random number, and where the index k varies from 1 to the number of assets in the portfolio. For each scenario and for each asset, the agency makes a random draw for F_k^I. For each asset, Fitch then calculates the asset latent variable Y_k as follows:

$$Y_k = \sqrt{\rho_0} \times F^G + \sqrt{\rho_i^R} \times F_i^R + \sqrt{\rho_j^S} \times F_j^S + \sqrt{1 - \rho_i - \rho_j} \times \tilde{F}_k$$

where

$$\rho_i^R, \rho_j^S$$

are correlation premiums for region and sector; and

$$\rho_0$$

is the global correlation.

It can be seen from the above equation that the asset latent variable depends on both the scenario variables as well as the asset idiosyncratic factor. Moreover, it can be proven mathematically that the asset latent variable will also be a zero mean unit variance Gaussian random variable. Default is said to occur when the asset latent variable falls below a threshold (determined from the PD using the inverse normal function). It can readily be seen from the above equation that in certain scenarios where the magnitudes of the risk factors are large then it is unlikely that the asset latent variable drops below the threshold. On the other hand, when the scenario variables are small then it is more likely that a large number of defaults occur.

For each scenario, Fitch will have a list of assets that have defaulted. The agency adds up the asset values or notionals of the defaulted assets to get the total notional loss for the portfolio. Fitch also calculates and stores the average recovery rate for each scenario. After the required number of scenarios has been generated, the agency constructs the cumulative distribution of the notional loss and of the recovery rate. The RDR, RRR and RLR levels are then simply read off from the distribution for the desired confidence levels.