Certificates

A Research Publication by DZ BANK AG

Certificate research methodology

CERTIFICATES

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Certificate research is an extension of the evaluations of shares, indices and commodities generated in fundamental research to include an option component aimed at changing the payment profile of the investment in relation to a direct investment. This is done in light of the finding that the symmetric risk-opportunity profile arising from direct investment often fails to meet the desired risk profile of private investors (failure to make a profit is more acceptable than a loss). This discrepancy is minimised by resorting to the opportunities offered by the options market which would otherwise not be accessible for private investors.

The aim of this certificate research is mostly to recommend certificates which are more likely to generate a profit than would be the case with a direct investment ("loss avoidance", "sideways yield"). Investors often consciously forego the chance of very big gains and accept a below-average value evolution in the case of fast rising underlying securities. The structures recommended in the present paper have a fundamentally defensive character in relation to direct investment.

Certificates are structured/composite investment products which are formed by being linked to an underlying security (equities, indices, interest rates, commodities) with an option (call/put). In legal terms, such certificates are bearer securities of an issuer, which means that they have an inherent credit worthiness risk.

DZ Bank's certificate research covers and analyses the following certificate structures: (protect/barrier) reverse convertible bonds, (capped) bonus certificates, discount certificates along with sprint and outperformance certificates.

Purely theoretically, the underlying security spectrum to which the certificate structures relate includes all shares, share indices and commodities covered by DZ BANK Research. The selection of underlying securities is limited by the fact that the only shares which are suitable as underlying security for a certificate are 1) shares rated "Buy" or “Hold” by DZ BANK Equity Research at the time of the certificate recommendation, and 2) shares on which options are traded on the futures markets, since certificate structure are impossible to construct without options.

DZ Bank's certificate research is aimed at the following: Volks- and Raiffeisenbanken and at customers (or not) of the Volks- and Raiffeisenbanken with sufficient knowledge and experience of certificate transactions (private investors who manage their own investments).

The analysis of certificate structures is based on the analysts' assessment of the underlying securities and an analysis of the volatility conditions surrounding the underlying securities. In addition, the analysis includes market-sensitive factors such as the sector in question in the case of shares.

RELEVANTE FACTORS IN THE ANALYSIS OF CERTIFICATES

Volatility as major influence factor

Certificates have an embedded an option component. The premiums which come with these options depend primarily on the extent of the implicit volatility which is priced in and on the expected fluctuation range. This means that the level of implied volatility is the key factor for the option price. Bond certificates buy or sell implied volatility, and consequently, the level of volatility has a crucial impact on terms and conditions.

Certificates which indirectly buy volatility benefit from low volatility since low volatility means a fall in the premiums which the issuer has to pay to buy the options required to construct the certificates. This means better financing conditions, e.g. in the form of a higher leverage in the case of outperformance certificates. In contrast, products which sell volatility as part of their construction benefit from high volatility since it leads to an increase in the option premiums which the issuer earns indirectly by selling options, leading to better conditions, e.g. in the form of higher coupons in the case of reverse convertible bonds.

Futures curve evolution in the case of commodities certificates

In the case of commodity certificates, the embedded options do not relate to the commodity itself but rather to the futures contracts on the commodity in question. For this reason, what is relevant is the current evolution of the futures curve of the underlying commodity which is composed of the various maturities of the futures contracts. Depending on whether the futures curve rises or falls, so the options become more or less expensive as the maturity of the futures contracts increases. The level of the option premiums in turn has an impact on the terms and conditions of the investment certificate.

SELECTION PROCESS

Choice of suitable underlying security and structure to match

Certificate research acts as the interface between the derivatives/options analysis segment and the equity/commodity markets analysis segment. In order to create an additional, and sensible, investment alternative to a direct investment in an underlying security and therefore generating added value for investors, analysts use current evaluations of underlying securities drawn up by the equity and commodity research team to select those underlying securities which are suitable for securitisation as a structured product. The expected upside potential can be estimated based on the fair value of the share indicated in the analysis of the underlying asset or on the 12-month price target for equity indices and commodities. The volatility conditions applying to the respective asset are then examined. Market expectations and the analysis of the volatility situation are used to determine what would be a suitable certificate structure. Once the structured product is in place, a sensible maturity is worked out using the volatility structure of the underlying security, where possible. Otherwise, the maturity is determined based on the fundamental outlook for the underlying security. Further features such as caps and barriers or strike price are geared to the underlying security's fair value, and, where possible, to the price performance of the underlying security, e.g. historical lows.

Alternatively, within a volatility-driven approach, it is also possible to generate a recommendation based on a particular volatility situation applying to an underlying security. If the level of volatility increases significantly, e.g. ahead of the publication of quarterly figures in the case of a corporation, in such a way that this level of volatility then becomes suitable for securitisation through a structured product, then the fundamental situation of the underlying security is only analysed in the second step using the evaluation worked out by the relevant equity analyst. If the fundamental outlook is positive, then a concrete structure is worked out as described above, based on the criteria listed.

In view of the method used, recommendations derived in the context of the certificate analysis will not run counter to recommendations derived from fundamental analysis. A fundamental principle of certificate research is that a structure is never recommended for "upward" participation (delta > 0) if the underlying security recommendation is "sell". Conversely, a structure never has a "downward" participation recommendation (delta < 0) if the underlying security has a positive analyst rating. For shares with a “Hold” recommendation we aim at a “sideways yield”, i.e., a positive certificate yield given an unchanged share price. Furthermore we would avoid a loss at the time of expiry in case the share trades at a 10% discount of the fair value, which is the maximum downside covered by a “Hold” recommendation.

SOURCES: DATA, STUDIES, INFORMATION

Forecasts on underlying securities

- **Equity (-market) forecasts**: these are taken from DZ Bank's equity/investment research.

- **Commodity forecasts:** these are taken from DZ Bank's commodity research.

News

- **News services**: the latest news and data on implied volatility is sourced from Bloomberg.

CERTIFICATE CATEGORIES

Reverse convertible bonds

A reverse convertible bond is a structured product primarily suited for investors who are expecting the underlying security to trade sideways or slightly higher. Upon maturity, investors receive a fixed amount of interest in the form of a coupon. In contrast, repayment is variable and depends on the price performance of the security underlying the bond, either a share or index. Depending on the terms and conditions, the structure is also given a buffer in the form of a strike price which is below the current price level, to offset falling prices.

A barrier reserve convertible bond is a specific type of reverse convertible bond which includes a further, deeper imbedded safety barrier than in the case of the standard product.

Bonus certificates

A bonus certificate is an investment certificate which is mainly suited for investors who are expecting the underlying security to trade sideways or (slightly) higher. The certificate offer investors an opportunity to participate in this price performance in the form of positive yields. At the same time, the certificate also offers a partial protection of the capital invested in the form of a price buffer.

A bonus certificate with a cap is a specific form of bonus certificate which sets a limit (cap) on the maximum potential gain. On the other hand, the safety buffer is mostly bigger than in the case of the standard product.

Discount certificate

A discount certificate is an investment certificate which is mainly suited for investors who are expecting the underlying security to trade sideways or to rise slightly. With the acquisition of this type of certificate, investors indirectly buy the underlying security at a discount. The discount acts as a safety buffer in the event of the price of the underlying security falling. In exchange, investors only benefit from any rise in the price up to a pre-determined ceiling, the cap.

Outperformance certificate

By buying an outperformance certificate, investors are betting on a marked price rise for the underlying security. However, in exchange for the chance of a disproportionately large participation in the price advance, investors waive all protection in the form of a price buffer.

Sprint certificates

When buying a sprint certificate, investors are banking on a rising price for the underlying security. In exchange for the chance of a disproportionate participation in any price gain, investors waive all protection in the form of a price buffer. In addition, potential gains are limited by a built-in cap.

GLOSSARY = THEORETICAL BASIS

Options and volatility form the theoretical basis for the analysis of certificate structures.

Derivatives

A derivative (from the Latin: derivare = to derive) is a financial instrument whose price is dependent on the price of the underlying security. Options are derivatives in this context since they are measured against an underlying security as reference.

Option

An option is a contingent claim on a future transaction. One party to the contract (the bearer/buyer of the option) is given the right to decide at some time in the future whether actually to carry out the transaction at the conditions agreed. The seller of the option assigns this right in exchange for which they receive a premium when the option is sold (option premium), which they receive irrespective of the exercise of the option right.

Call

A call is an option to buy a specific quantify of an underlying security at a specified price (strike price of option), and a specific time in the future.

Put

A put is an option to sell which gives the holder the right to sell a specific amount of an underlying security at a specific price (strike price of the option) at a specific date in the future.

Standard deviation

The standard deviation is a measure of the dispersion of a variable (in this instance: the price) around its mean. For the purpose of financial calculations, a normal (or Gaussian) distribution of the variable is assumed (e.g. share-price changes). In this case, around 68% of all observations are within an interval of plus/minus one standard deviation away from the mean and around 95% are within the interval of plus/minus two standard deviations.

Volatility

Volatility is a statistical measure of the fluctuation of a trading price series (in this instance: share, bond or commodity prices). It can also be derived from historical figures (historical volatility) or from market prices for options (implied (=expected) volatility). Volatility is defined as the standard deviation in the changes in the parameters analysed (the prices) and is often used as a measure of risk.

Volatility skew

The volatility skew shows the volatility depending on the moneyness of options with the same maturity on a specific underlying asset. Moneyness therefore indicates to what extent an option is in-the-money. As a rule, options with low strike prices (in-the-money calls and out-of-the-money puts) have a higher implied volatility than options with a high strike price (in-the-money puts and out-of-the-money calls). This leads to a falling curve.

The so-called reverse skew often occurs in the case of long reverse convertible bonds and index options. The opposite is called a forward skew, which mainly occurs with commodity options. In this case, options with a low strike price have a lower implied volatility than options with a high strike price. Their course is therefore rising.

Volatility smile

So-called volatility smiles are patterns which arise as a result of a U-shaped volatility curve and often occur in the case of near-term equity and currency options. Such volatility smiles occur when the volatility which has been priced in for options with a high or low strike price is higher than in the case of options which are at-the-money.

Exotic option

Exotic options (generally barrier options) are financial derivatives derived from standard options which include a knock-in or knock-out barrier in addition to the strike price.

Moneyness

Moneyness indicates the extent to which an option is in-the-money, i.e. the relation between the strike price of an option and the current trading price of the underlying security. A distinction is made thereby between in-the-money, at-the-money and out-of-the-money options.

At-the-money options

At-the-money options are options for which the price is the same or at-the-money as the current spot price of the underlying security.

In-the-money options

In-the-money options are options whose strike price is in-the-money. In the case of put options, this is the case when the strike price of the underlying security is lower than its market price. In the case of call options, it is the other way around. A call option is trading in-the-month if the strike price is higher than that market price of the underlying security. In both cases, the options are said to have an intrinsic value.

Out-of-the-money options

Out-of-the-money options are call options with a strike price that is higher than the market price of the underlying security; out-of-the-money put options are options with a strike price that is lower than the market price of the underlying securities.

I. IMPRINT

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1. Mandatory Disclosures for Financial Analyses and further Remarks

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Financial analyses are **independent client information** containing **generic investment recommendations** regarding **specific issuers** or **specific financial instruments, but they do not** make allowance for any individual investment criteria.

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3.2 Each analyst involved in the preparation of the contents of this Research Publication confirms that
- this Research Publication represents his independent specialist evaluation of the analysed object in compliance with the Conflicts of Interest Policy of DZ BANK and
- his compensation depends neither in full nor in part, neither directly nor indirectly, on an opinion expressed in this Research Publication.

4. Definitions of the Categories for Investment Recommendations in Financial Analyses

The **categories** for **investment recommendations** in **Financial Analyses** of DZ BANK are defined as follows:

4.1 Shares:

- Fundamental Analysis:
"**Buy**" means that the absolute appreciation expected in the next twelve months is greater than 10%.
"**Sell**" means that the absolute depreciation expected in the next twelve months is greater than 10%.
"**Hold**" means that the absolute *price* volatility expected in the next twelve months lies between +10% and -10%.

- Technical (Chart) Analysis (tertiary trend):
The short term technical estimate refers to the short tertiary move of the share:
„**Positive**" means that an absolute appreciation could be expected during the next week.
"**Negative**" means that an absolute depreciation could be expected during the next week.
"**Neutral**" means that no absolute change of price could be expected during the next week.

- Technical (chart) Analysis (secondary trend):
The longer term technical estimate refers to the shorter secondary move of the share:
„**Positive**" means that an absolute appreciation greater than 10% could be expected during the next six months.
"**Negative**" means that an absolute depreciation greater than 10% could be expected during the six months.
"**Neutral**" means that an absolute change of price between +10% to -10% could be expected during the next six months.

4.2 Fixed Income Instruments:

The prevailing factor for an investment recommendation regarding an **issuer** is whether, according to the estimate of DZ BANK, this issuer's bonds are able to perform better, worse or in tandem with the bonds of comparable issuers in the next six months. The below defined recommandation categories apply to 'senior unsecured bonds' denominated in Euro and in case of Emerging Markets issuers in individual cases also in US-Dollar as well as to 'covered bonds issued by credit institutions' in Euro:
"**Outperformer**" means that a better performance is expected for the issuer's bonds than for the bonds of comparable issuers.
"**Underperformer**" means that a worse performance is expected for the issuer's bonds than for the bonds of comparable issuers.
"**Market performer**" means that the performance of the issuer's bonds is not expected to materially differ from the bonds of comparable issuers.

4.3 Categories for isolated statements without investment recommendation

Statements on the **isolated evaluation of specific aspects** that **precede an investment recommendation** on a financial instrument and / or an issuer - **especially** according to the **sustainability criteria** defined by DZ BANK, its defined **value approach**, its defined **asset allocation** (DZ BANK Sample Portfolio), its defined sector strategy Euro-Stoxx (**DZ BANK Sector Favorites**), its defined valuation of payments to beneficiaries (**DZ BANK Dividend Aristocrats**) , its **country weightings for covered bonds** and its **CRESTA-SCORE MODEL** - are **not investment categories** and therefore **do not contain** any **investment recommendations**.
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5. Scheduled Updates and Validity Periods of Investment Recommendations

5.1 The frequency of **updates** of **Financial Analyses** depends in particular on the underlying macroeconomic conditions, current developments on the relevant markets, the current development of the analyzed companies, measures undertaken by the issuers, the behavior of trading participants, the competent supervisory authorities and the competent central banks as well as a wide range of other parameters. The periods of time named below therefore merely provide a **non-binding indication** of when an updated investment recommendation may be expected.

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If no update is made, investment recommendations **end / lapse on expiry** of the **validity periods** named below. These periods **begin** on the **day** and at the **time** the investment recommendation is **completed**.

5.3 The **validity periods** for investment recommendations (**financial analyses)** are as follows:

Shares:	
Fundamental analysis	six months
Technical (chart) analysis (tertiary trend)	one week
Technical (chart) analysis (secondary term)	six months
Fixed income instruments:	
Issuers (senior unsecured bonds)	six months
Issuers (covered bonds)	one trading day

5.4 **Evaluations of isolated aspects without investment recommendation** have the following validity periods:

Sustainability analyses:	twelve months
Analyses according to the **value approach:**	one month
Asset allocation analyses (**DZ BANK Sample Portfolio**):	one month
Euro Stoxx sector strategy (**DZ BANK Sector Favorites**):	one month
Dividends **(DZ BANK Dividend Aristocrats)**:	three months
Credit trend issuers	twelve months
Share indices (fundamental):	three months
Share indices (technical / chart analysis):	one week
Share indices (technical daily):	publicationday
Currency areas:	six to twelve months
Allocation of market segments	one month
Country weightings for covered bonds:	six months
Derivatives:	
(Bund futures, Bobl futures, treasury futures, Buxl futures):	one month
Commodities:	one month

5.5 In a given case, updates of analyses may also be **temporarily suspended without prior announcement** on account of compliance with supervisory regulations.

5.6 If **no updates are to be made in the future** because the analysis of an object is to be discontinued, notification of this shall be made in the final publication or, if no final publication is made, the close of the analysis shall be given in a separate note.

6. General Overview of Investment Recommendations on Financial Instruments and Issuers

Each working day DZ BANK prepares a **general overview** of **all investment recommendations** on financial instruments and / or issuers disseminated in the last **twelve months**, containing all details specified by the supervisor. This list can be **read** and **downloaded free-of-charge** under **www.dzbank.com/disclosures**.

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7.9 The **quarterly information** on the share of the investment categories stated in **sub-paragraph 4.1** and **4.2** for **shares** and **fixed income instruments** in the total number of investment recommendations of DZ BANK **and** the **information** on the share of these categories relating to the issuers to whom DZ BANK has rendered services in the **past twelve months** in accordance with Appendix I Sections A and B of Directive 2014/65/EU, can be **read** and **downloaded free-of-charge** under **www.dzbank.com/disclosures**.

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