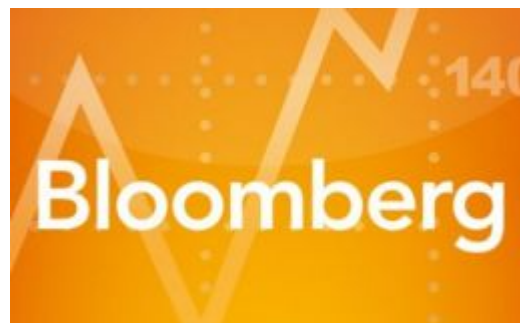




Building Option Strategies.

From Theory to Market Opportunities



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Agenda

- (1) Basics**
- (2) FX-Options**
- (3) The Model**
- (4) The Market**
- (5) Structures**
- (6) Discussion**



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(1) Basics

What we are talking about:

- 💰 The Foreign-Exchange Market
 - EUR/USD or EUR/HUF or CHF/HUF ...

- 💰 Hedging of exposures in foreign currencies
 - for importers and exporters
 - for speculative purpose



(1) Basics

Why is it important/necessary?

- 💰 Exchange rates may change ...
 - upwards
 - sideways
 - downwards

- 💰 But you never know when, where and how much ...
 - this may be a risk
 - but it could also be an opportunity



(1) Basics

How to deal with the risk or take the opportunity?

- Doing nothing -> is pure speculation!
- Forwards-> static, inflexible and without participation
- Options/Option Strategies -> the only rational alternative



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(2) Options

A fx-option gives the buyer the right to trade a certain currency against another currency within a certain maturity at a defined exchange rate. The value of that right is quoted as the option premium the buyer of the option has to pay to the seller of the option.

Call - options: the right to buy the base currency

Put - options: the right to sell the base currency

The buyer of the option has to pay the option premium; the seller of the option receives the premium; therefore one is able to sell options without being the owner of one.

(2) Options

	Buy (pay the premium)	Sell (receive the premium)
Call	right to buy the base currency	obligation to sell the base currency
Put	right to sell the base currency	obligation to buy the base currency



(2) Option-Parameters

- Currency Pair:** An option always consists of two currencies, one is to buy, the other is to sell.
i.e. EUR-Call/USD-Put
- Call or Put:** Without further notice “call” or “put” refer always to the base currency;
- Strike:** The price at which the base currency can be purchased (call) or sold (put) if the option will be executed.
- Expiry Date:** The date at which the buyer of the option has the right to draw the option.
- Notional:** The notional could be both: base currency or counter currency.
- Style:**
European: execution at expiry-date (i.e. 2 days before maturity) only
American: execution anytime during the duration (even in parts)
Asian: refers to the average of the time period



(2) Pricing-Parameters

- Forward rate:** Baseline for the calculation; defines in combination with the interest rate levels and the duration the intrinsic value of the option.
- Expiry Date:** The longer the duration the longer the uncertainty and therefore the time value (and the higher the time value, the higher the premium)
- Strike:** Defines whether an option is in the money, at the money or out of the money (the deeper an option is in the money, the higher the premium)
- Style:** European/American style option have a similar premium, Asian style options are cheaper
- Volatility:** The volatility defines the markets view of the range and the probability of future exchange rates (the higher the volatility the higher the premium)



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(3) The Model

A foreign currency can be seen as a share with known dividend yield, because the owner of the currency gets the yield of the foreign interest rate.

That is the reason why we refer to the Black-Scholes formula to determine the price of an option but we have to adjust that formula because we the expected value depends on the interest rate differential.:

The Garman/Kohlhagen-Formula:

$$Call = Kasse * e^{-rf * t} * N(d_1) - Strike * e^{-rd * t} * N(d_2)$$

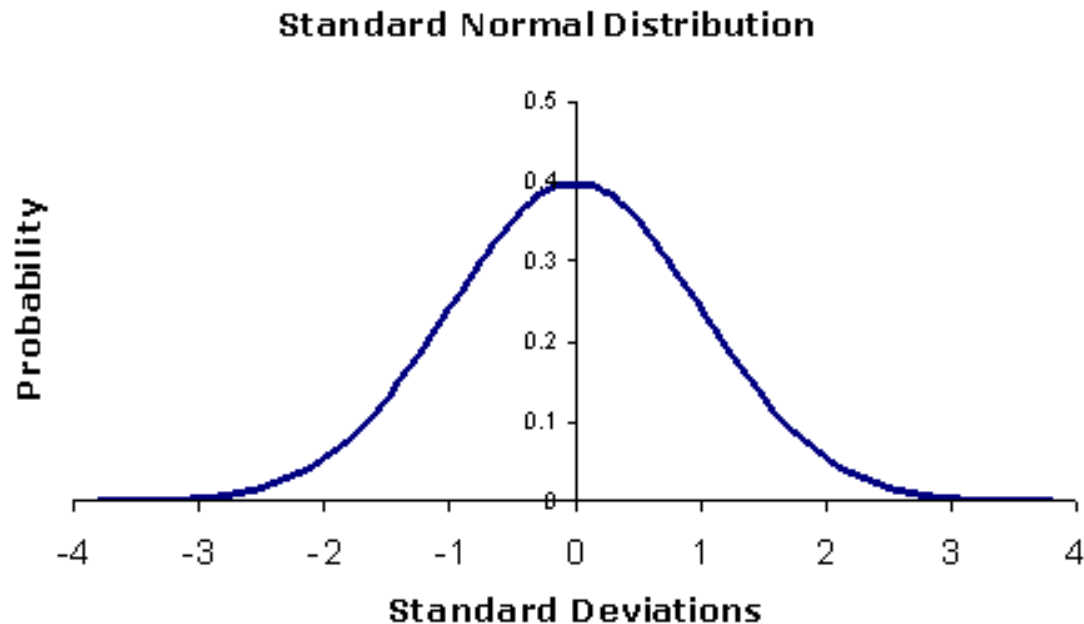
$$Put = Strike * e^{-rd * t} * N(-d_2) - Kasse * e^{-rf * t} * N(-d_1)$$

$$mit : d_1 = \frac{\ln \frac{Kasse}{Strike} + (rd - rf + \frac{\sigma^2}{2} * t)}{\sigma * \sqrt{t}}$$

$$und d_2 = d_1 - \sigma * \sqrt{t}$$

(3) The Model

- § The expected value refers to the forward rate and deviations are equiprobable
- § The price of an option is the difference between the cumulated probability that the strike will be attained at the expiry date and the current spot rate.





(3) Assumptions/problems of the model

- § There is a perfect capital market
- § FX-rates are following a standard normal distribution
- § The volatility is constant
- § There are risk-free interest rates in the market
- § Supply/Demand may be influenced by political, fundamental and/or technical factors



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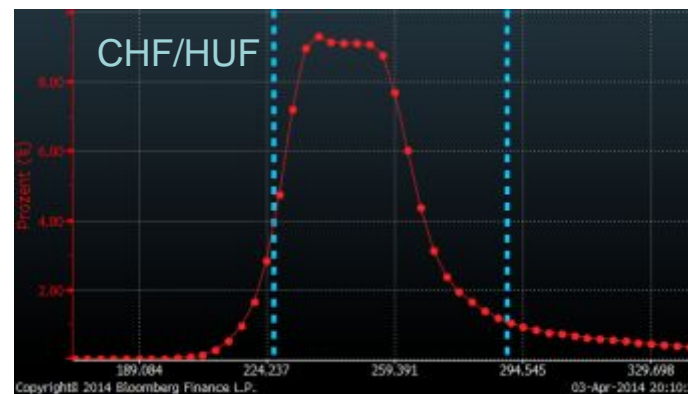
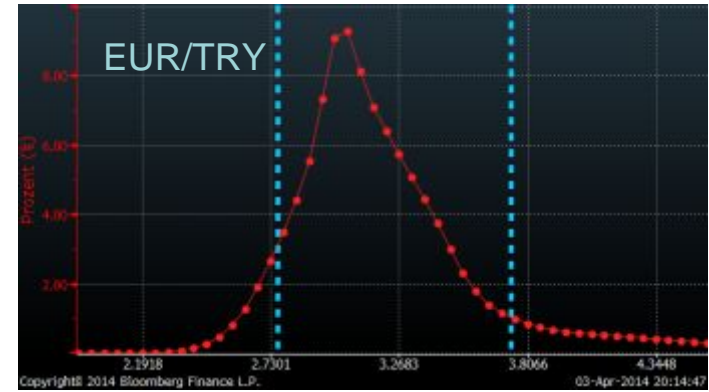
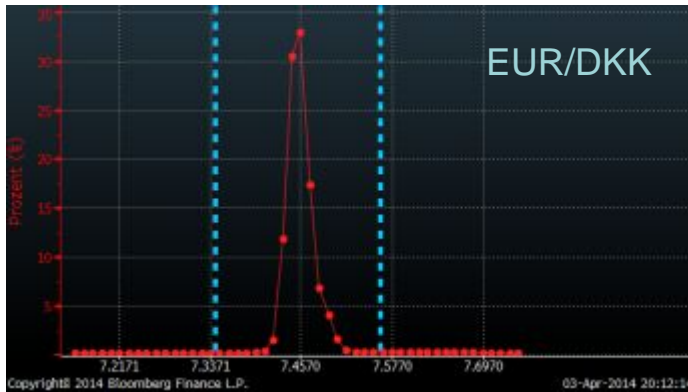
(4) The Market

But the real world

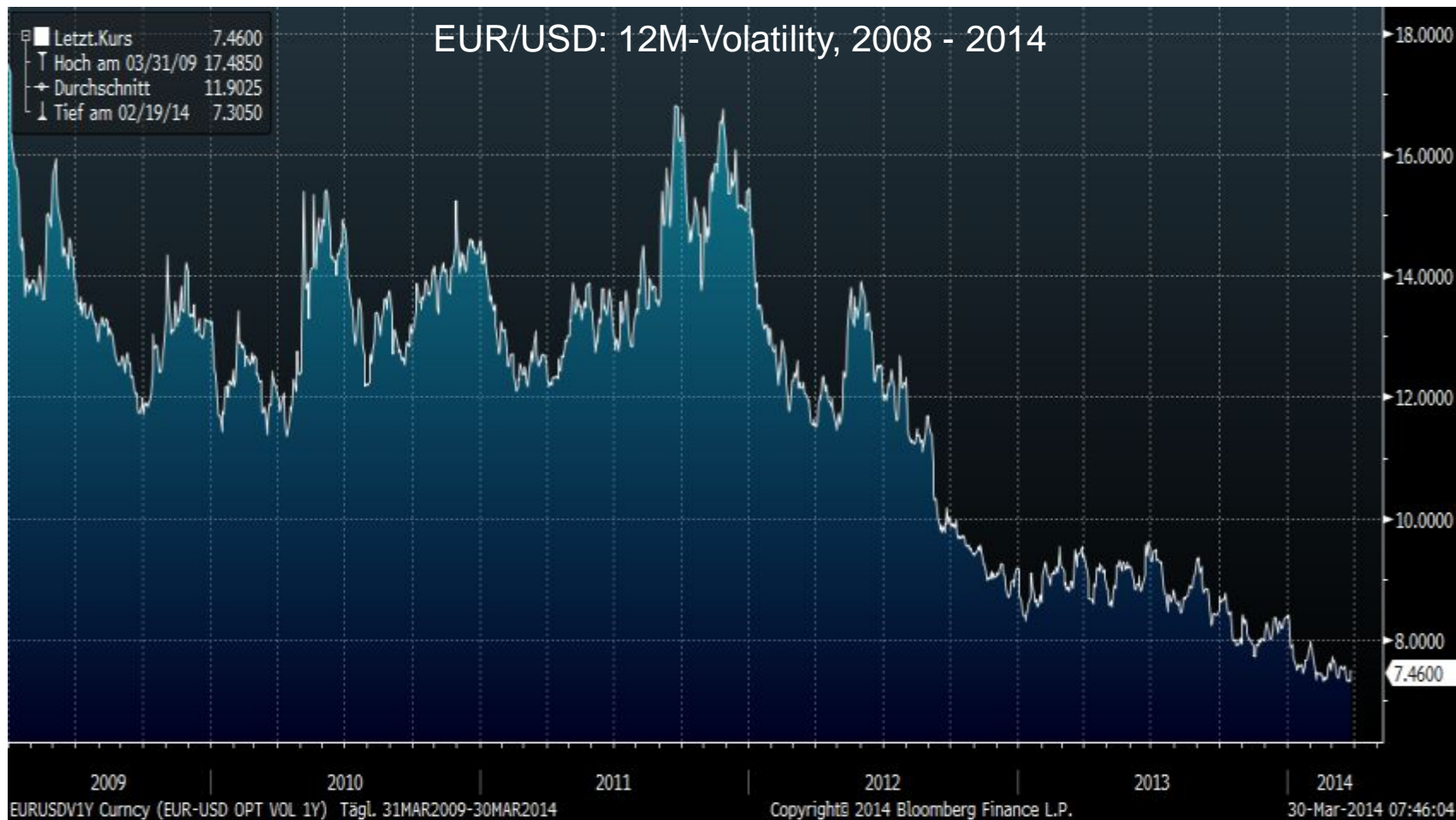
- 💰 Is not a perfect capital market
- 💰 Exchange rates may follow a normal distribution but it is not quiet clear
- 💰 The volatility is not constant
- 💰 There is a certain demand/supply referring to a currency
- 💰 There might be a higher probability for extreme values

That means the Black/Scholes- or Garmann/Kohlhagen-formulas are not false but in practice you have to adjust much more.

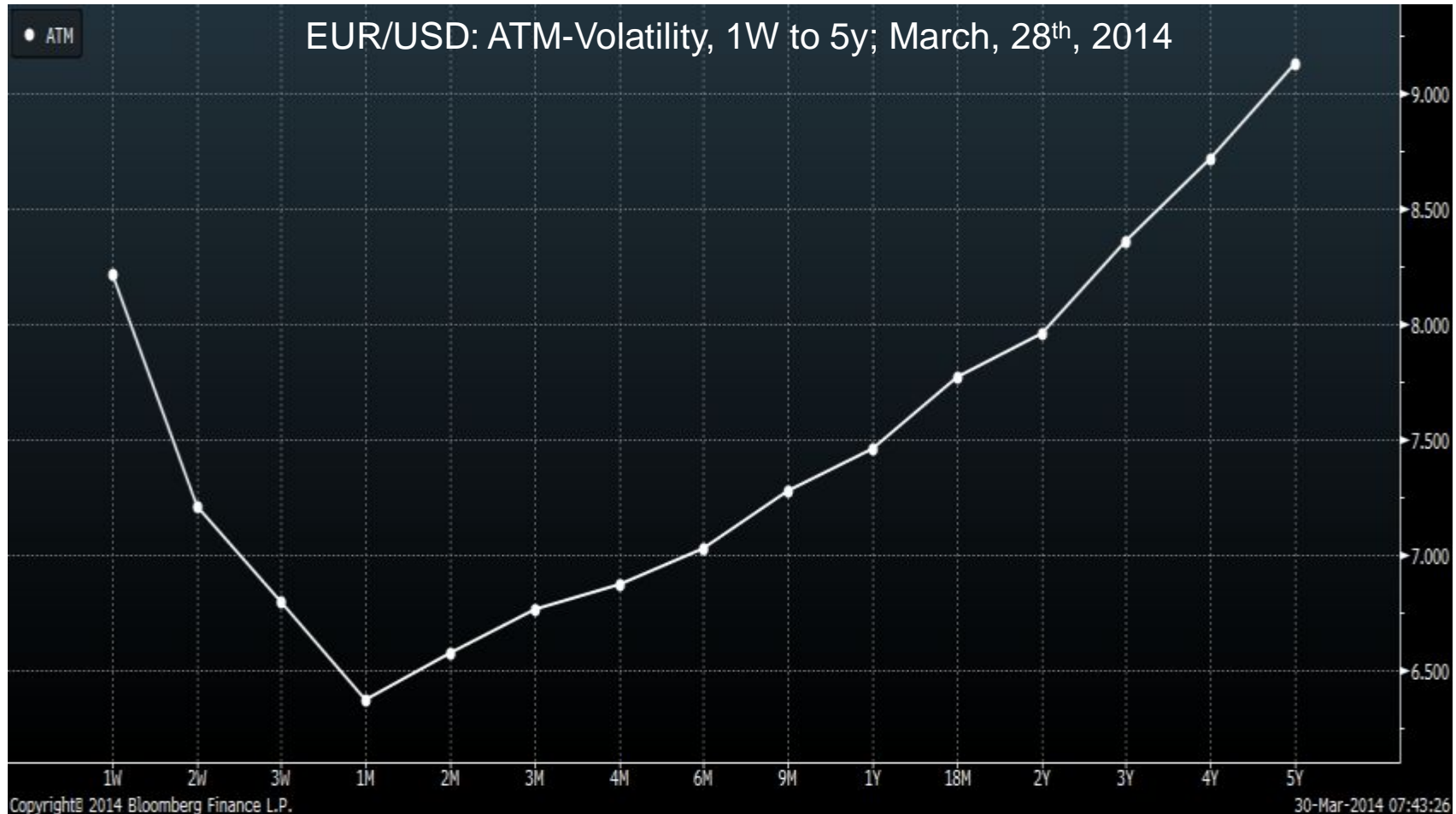
(4) The Normal Distribution is not certain



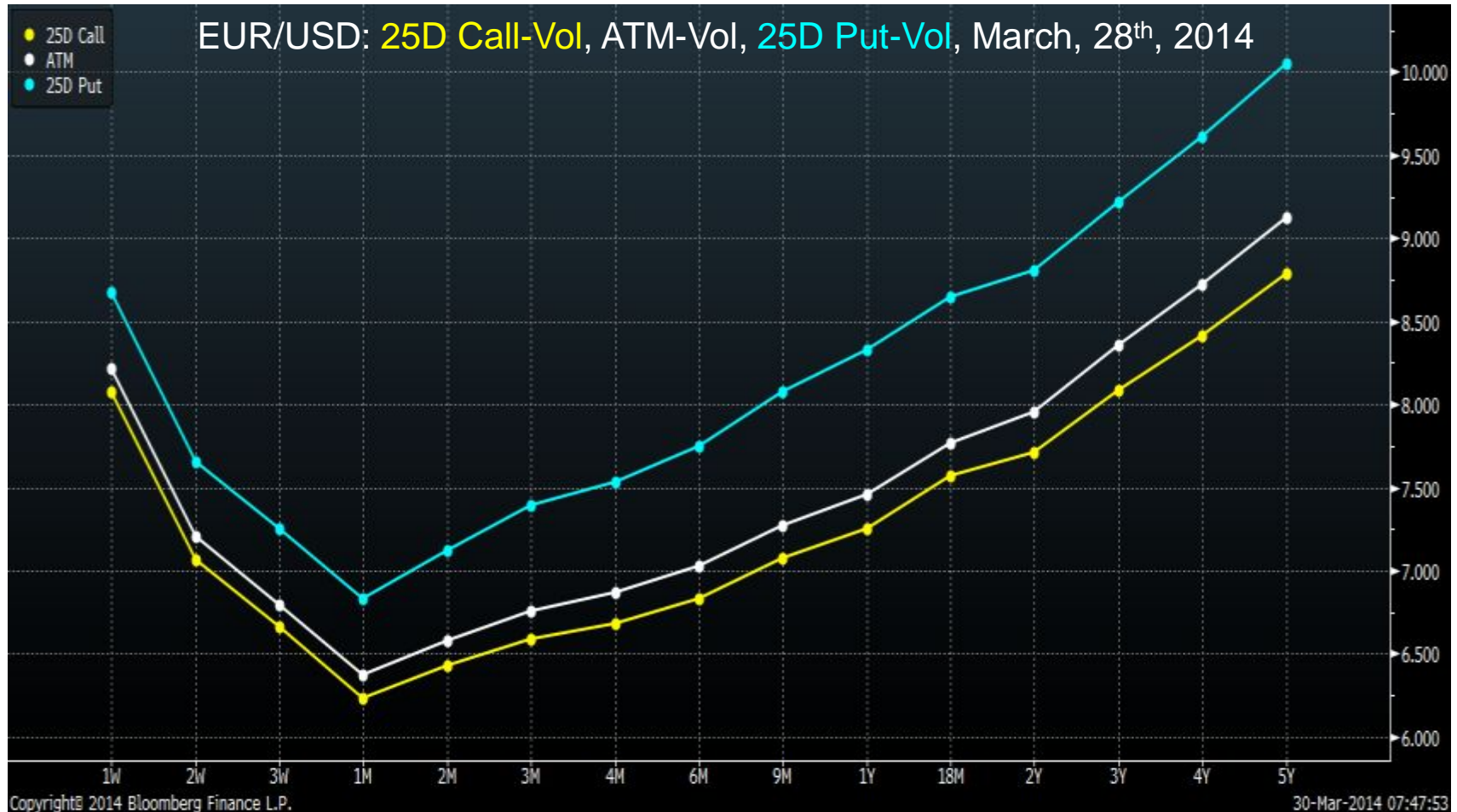
(4) Volatility is changing



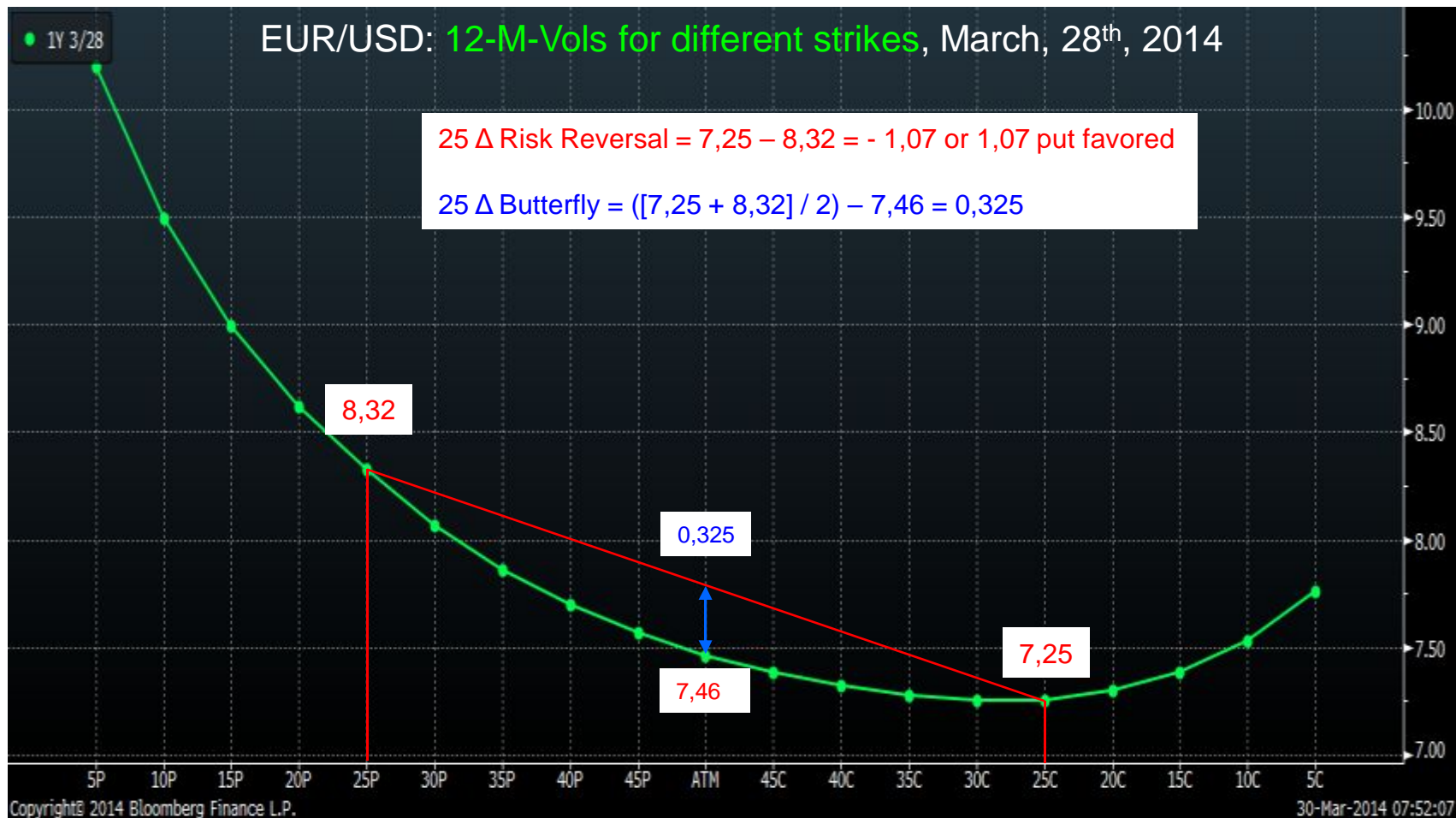
(4) Volatility is different for different maturities



(4) Volatility is different for different strikes



(4) The Vola-Smile





(4) The Market

These facts offer opportunities for building option strategies

- 💰 Options are cheaper the lower the volatility is
 - in major currencies volatilities lower 6% are cheap, higher 10% means expensive
- 💰 A high volatility means high premiums – both for buyers and sellers
- 💰 The volatility-smile and the skewness shows which options are relatively cheaper (Calls or Puts)
- 💰 The risk reversal shows the position of the market
 - a put-favored market means the Calls are cheaper than puts
- 💰 The butterfly shows if options are overbought
 - the lower the butterfly, the cheaper are strikes far out of / in the money



(4) The Market

Opportunities out of the current EUR/USD-World

- 💰 Buying options is cheap
- 💰 Buy short-term options, sell long-term options
e.g. buy 1 month, sell 3 weeks
- 💰 Buy EUR-Calls/USD-Puts and sell EUR-Puts/USD-Calls
- 💰 Ratios may intensify these effects



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(5) Structures

Range-Forward: buy EUR, sell USD

2-BLOOMBERG

Menü: FX-Derivate EUR-USD X-RATE Curncy OVML

<HELP> für Erklärungen.

90 Asset 91 Aktion 92 Produkte 93 Ansicht 94 Daten & Setup Optionsbe
 31 Lösen (Leg 2 Strike) 32 Laden 33 Speichern 34 Trade 35 CVA 30 An TR senden Ansic

61 Deal 1 62 +
 51 Pricing 53 Szenario

Strategie 1

		Leg 1	Leg 2
Pricing-Dat.	03/30/14 18:00		
Asset	EURUSD	EURUSD	EURUSD
Kassa	Mid 1.3750	1.3750	1.3750
Stil		Europäisch	Vanilla
Seite	Physisch	Kunde kauft	Physisch
Call/Put		EUR	Call
Verfall	1 Jahr	1 Jahr	03/31/15
Lieferung	NY 10.00 Uhr	NY 10.00 Uhr	NY 10.00 Uhr
Strike		Termin 1.4282	3.84% OTMF 1.3105
Nominal	USD	USD 1,000,000.00	USD 1,000,000.00
Modell		Black-Scholes	Black-Scholes
Weitere Marktdaten			
Vola	BGN	7.136%/7.383%	8.104%/8.372%
Vola-Spread		0.247%	0.268%
Punkte	BGN	3.23...	3.23...
Termin	Mid	1.3753...	1.3753...
EUR Einl.	Implizit	0.093...%	0.093...%
Ergebnisse			
Preis	% EUR	0.0000%	1.4614% P
Prämie	EUR	0.00	10,232.44 P
Präm.dat.		04/02/14	04/02/14
Delta	Kassa	60.3757%	30.0000%
Hedge		-422,744.41	-210,056.63

50 H/V wechs. Zoom

Manage Economic Workbench Chart Colors, Labels, Axes, Title
 Open "Edit Graph" and select "Property Manager"

ECW

(5) Structures

Range-Forward: sell EUR, buy USD

2-BLOOMBERG

Menü: FX-Derivate | EUR-USD X-RATE Curncy | OVML

<HELP> für Erklärungen.

90 Asset - 91 Aktion - 92 Produkte - 93 Ansicht - 94 Daten & Setup - Optionsbe
 31 Lösen (Leg 2 Strike) | 32 Laden | 33 Speichern | 34 Trade | 35 CVA | 36 An TR senden

61 Deal 1 | 62 +
 51 Pricing | 53 Szenario

Strategie 1

	Leg 1		Leg 2	
Pricing-Dat.	03/30/14	18:00		
Asset	EURUSD		EURUSD	
Kassa	Mid	1.3750	1.3750	1.3750
Stil			Europäisch	Vanilla
Seite	Physisch		Kunde kauft	Physisch
Call/Put	EUR		EUR	Put
Verfall	1 Jahr		1 Jahr	03/31/15
Lieferung	NY 10.00 Uhr		NY 10.00 Uhr	04/02/15
Strike		Termin	1.3176	4.19% OTMF
Nominal	USD		USD	1,000,000.00
Modell			Black-Scholes	Black-Scholes
Weitere Marktdaten				
Vola	BGN		8.004%/8.262%	7.167%/7.401%
Vola-Spread			0.258%	0.235%
Punkte	BGN	Mid	3.23...	3.23...
Termin		Mid	1.3753...	1.3753...
EUR Einl.	Implizit	Mid	0.093...%	0.093...%
Ergebnisse				
Preis	% EUR		1.5516% P	1.6669% R
Prämie	EUR		11,775.73 P	11,775.73 R
Präm.dat.			04/02/14	04/02/14
Delta	Kassa		-30.0000%	-34.2106%
Hedge			469,352.23	227,680.19

50 H/V wechs. | Zoom

What is the CVA for my FX Derivatives Portfolio? **MAR**

(5) Structures

Example: EUR/USD Range Forward (spot 1,3750, 1y):

For a EUR-buyer/USD-seller:

Buy:

EUR-Call/USD-Put, 30% Delta = Strike 1,4282

= spot + 532 pips

Sell:

EUR-Put/USD-Call, 27% Delta = Strike 1,3105

= spot – 645 pips (participation is higher)

- Put-volatility is higher than Call-volatility, so the premium you get for a 30% delta Put-Option is more than the premium you have to pay for a 30% delta Call-Option

For a EUR-seller/USD-buyer:

Buy:

EUR-Put/USD-Call, 30% Delta = Strike 1,3176

= spot - 574 pips

Sell:

EUR-Call/USD-Put, 34% Delta = Strike 1,4156

= spot + 406 pips (participation is lower)

- Put-volatility is higher than Call-volatility, so the premium you get for a 30% delta Put-Option is more than the premium you have to pay for a 30% delta Call-Option

Higher than



(5) Structures

Participation-Forward: buy EUR, sell USD

2-BLOOMBERG

Menü: FX-Derivate | EUR-USD X-RATE Curncy | OVML

<HELP> für Erklärungen.

90 Asset - 91 Aktion - 92 Produkte - 93 Ansicht - 94 Daten & Setup - Optionsbe
 31 Lösen (Leg 2 Nominal) - 32 Laden - 33 Speichern - 34 Trade - 35 CVA - 36 An TR senden

61 Deal 1 - 62 +
 51 Pricing - 53 Szenario

Strategie 1

	Leg 1		Leg 2	
Pricing-Dat.	03/30/14	18:00		
Asset	EURUSD		EURUSD	
Kassa	Mid	1.3750	1.3750	1.3750
Stil			Europäisch	Vanilla
Seite	Physisch		Kunde kauft	Physisch
Call/Put	EUR		EUR	Call
Verfall	1 Jahr		1 Jahr	03/31/15
Lieferung	NY 10.00 Uhr		NY 10.00 Uhr	04/02/15
Strike		Termin	1.4052	2.17% OTMF
Nominal	USD		USD	1,000,000.00
Modell			Black-Scholes	Black-Scholes
Weitere Marktdaten				
Vola	BGN		7.204%/7.432%	7.204%/7.432%
Vola-Spread			0.227%	0.227%
Punkte	BGN	Mid	3.23...	3.23...
Termin		Mid	1.3753...	1.3753...
EUR Einl.	Implizit	Mid	0.093...%	0.093...%
Ergebnisse				
Preis	% EUR		2.0326% P	4.1152% R
Prämie	EUR		14,464.79 P	14,464.79 R
Präm.dat.			04/02/14	04/02/14
Delta	Kassa		69.5619%	37.8292%
Hedge			-495,032.10	-269,208.98

50 H/V wechs. Zoom

Premium Derivative Hourly Fixings in DFI

(5) Structures

Participation-Forward: sell EUR, buy USD

2-BLOOMBERG

Menü: FX-Derivate | EUR-USD X-RATE Curncy | OVML

<HELP> für Erklärungen.

90 Asset - 91 Aktion - 92 Produkte - 93 Ansicht - 94 Daten & Setup - Optionsbe
 31 Lösen (Gemeinsamer St... | 32 Laden | 33 Speichern | 34 Trade | 35 CVA | 36 An TR senden

61 Deal 1 | 62 +
 51 Pricing | 53 Szenario

Strategie 1

	Leg 1		Leg 2	
Pricing-Dat.	03/30/14	18:00		
Asset	EURUSD		EURUSD	
Kassa	Mid	1.3750	1.3750	1.3750
Stil			Europäisch	Vanilla
Seite	Physisch		Kunde Kauft	Physisch
Call/Put	EUR		EUR	Put
Verfall	1 Jahr		1 Jahr	03/31/15
Lieferung	NY 10.00 Uhr		NY 10.00 Uhr	04/02/15
Strike		Termin	1.3448	2.22% OTMF
Nominal	USD		USD	1,000,000.00
Modell			Black-Scholes	Black-Scholes
Weitere Marktdaten				
Vola	BGN		7.665%/7.897%	7.665%/7.897%
Vola-Spread			0.232%	0.232%
Punkte	BGN	Mid	3.23...	3.23...
Termin		Mid	1.3753...	1.3753...
EUR Einl.	Implizit	Mid	0.093...%	0.093...%
Ergebnisse				
Preis	% EUR		2.1284% P	4.2569% R
Prämie	EUR		15,827.01 P	15,827.01 R
Präm.dat.			04/02/14	04/02/14
Delta	Kassa		-39.2259%	-58.4636%
Hedge			291,682.70	217,366.73

50 H/V wechs. | Zoom

BACKTEST FX STRATEGIES WITH TECHNICAL OVERLAYS WITH FXSW

(5) Structures

Example: EUR/USD Participation Forward (spot 1,3750, 1y):

For a EUR-buyer/USD-seller:

Buy:

EUR-Call/USD-Put, Strike 1,4052

= spot + 302 pips

Sell:

EUR-Put/USD-Call, 49,4% notional, Strike 1,4052

= 50,6% participation

Higher than

- EUR-Call is cheaper than EUR-Put, thus the EUR-Put delivers more premium, so it is sufficient to sell 49,4% of the notional only.

For a EUR-seller/USD-buyer:

Buy:

EUR-Put/USD-Call, Strike 1,3448

= spot – 302 pips

Sell:

EUR-Call/USD-Put, 50% notional, Strike 1,3448

= 50,0% participation

- the EUR-Put is more expensive, so for the sold EUR-Call you will not get so much premium, so you have to sell 50% of the notional.

(5) Structures

And what about this one?

2-BLOOMBERG

Menü: FX-Derivate | EUR-USD X-RATE Currency | OVML

<HELP> für Erklärungen.

90 Asset • 91 Aktion • 92 Produkte • 93 Ansicht • 94 Daten & Setup • Optionsbewertung
 31 Lösen (Common Lower B... • 32 Laden • 33 Speichern • 34 Trade • 35 CVA • 30 An TR senden • Ansicht teilen
 61 Deal 1 • 62 +
 51 Pricing • 53 Szenario

Strategie 1

	Leg 1	Leg 2	Leg 3
Pricing-Dat.	03/30/14		
Asset	EURUSD	EURUSD	EURUSD
Kassa	Mid 1.3750	1.3750	1.3750
Stil	DKO	DKI	DKI
Seite	Physisch	Physisch	Physisch
Call/Put	Kunde Kauft	Kunde Kauft	Kunde verkauft
Verfall	1 Jahr	1 Jahr	1 Jahr
Lieferung	NY 10.00 Uhr	NY 10.00 Uhr	NY 10.00 Uhr
Strike	1.3000	1.4000	1.4000
Nominal	USD 1,000,000.00	USD 1,000,000.00	USD 1,500,000.00
Barrieretyp	Amerikanisch	Amerikanisch	Amerikanisch
Obere Barriere	1.4500	1.4500	1.4500
Untere Barriere	1.2565	1.2565	1.2565
Oberer Rebate	0.00	0.00	0.00
Unterer Rebate	0.00	0.00	0.00
Fenster, Start	03/31/14	03/31/14	03/31/14
Window end	03/31/15	03/31/15	03/31/15
Modell	Vanna-Volga	Vanna-Volga	Vanna-Volga
Weitere Marktdaten			
ATH Vola	BGN 7.462%	7.462%	7.462%
Ergebnisse			
Preis	0.0000%	1.5979% P	2.5576% R
Premie	0.00	12,291.30 P	27,402.99 R
Prem.dat.	04/02/14	04/02/14	04/02/14
SLV Prem	Berechnen		
Delta	78.9729%	-14.8300%	42.5856%
Hedge	-607,483.98	114,076.68	-304,183.21

50 H/V wechs. Zoom + 75%

Analyze USDTRY Volatility Skew in OVDV



(5) Conclusions

- 💰 Because the market is not like the theoretical world of option pricing there are a lot of opportunities.
- 💰 You can take these opportunities either for hedging purposes or speculative intentions.
- 💰 To find out which strategies make sense you have consider
 - the relative level of the volatility
 - if the market is call- or put favored (risk reversal)
 - the intensity of the smile (butterfly)
 - if ratios could be incurred



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(6) Discussion





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