



SALES & TRADING INTERVIEW GUIDE

Written by Professional Traders Working On The Sell-Side

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Word from the Authors

Thank you for purchasing our eBook. The purpose of this guide is to prepare you successfully for the various interview stages for positions in trading and you to get an offer either for an intern or graduate role.

This book was written by three professional traders with vast experience in the industry. You can be sure you have prepared well if you spend time reading and understanding this guide (along with reading the financial news on a daily basis, which is imperative if you would like to work in trading).

The Canary Wharfian team wishes you the best for your interviews. Keep in mind: failing to prepare is preparing to fail. Make the first step towards landing an offer by studying our guide.

Part I (**Quick & Easy**) has a total of 44 interview questions, and are the ones that most likely to come up in an interview. Concise explanations are provided.

Part II (**Extended Explanations**), which is a set of 10 questions and answers, contains significantly more detailed explanations. It is to provide you with a deeper understanding of global markets and how they work, should you be asked those questions in an interview.

Part III (**The Trading Game**) is a short description of what usually happens at the final stage of the interview process (the Assessment Centre), and the strategy you should be following to excel at it.

Part IV (**Think Logically**) is a set of the most commonly asked brainteasers during interviews along with answers plus a guide to mental mathematics.

Part V (**Numbers To Know**) is a set of the key market indicators and a reliable source to find out about them, that you will probably be asked about in your interviews.

Part VI (**Glossary**) is a collection of terms that you should be familiar with going into any sales & trading interview.

We'd love to have your feedback on how we can improve this book, or your experience with it. Kindly send an email to us at canarywharfian@canarywharfian.co.uk.

*If you have a question about the content of this book do not hesitate to open a thread at the following link:
[Click Here](#)*

PART I | QUICK & EASY

Equities

1. Pitch me a stock.

This is time sensitive and something each candidate needs to prepare for him or herself. When pitching a stock give say 3 to 5 reasons why you like it and be mindful of possible follow up questions that challenge your pitch. If you can anticipate those questions and are able to prepare for them you will look very good. Use seekingalpha.com for ideas.

2. What is the alpha of a trading strategy? How would you measure it?

The alpha of a trading strategy is its risk-adjusted return. To measure it you need some model that quantifies how much risk the trading strategy takes. There are many different choices of models, but the simplest in the case of equities would be the CAPM (capital asset pricing model), which adjusts returns for the exposure on the aggregate stock market. In practical terms, you would run a time-series regression of the excess returns of the strategy (i.e. the strategy returns minus the risk-free rate) against contemporaneous excess market returns. The regression intercept gives the alpha.

A common mistake is to simply compare the returns of the strategy against the market return benchmark. This approach is problematic since it would not distinguish between two strategies that held the same underlying set of stocks in an unlevered versus levered portfolio. In this case, the levered long portfolio might very well have higher returns, but those returns would be the result of taking more risk. Furthermore, even without leverage, two strategies could have very different return sensitivities (or betas) to the market. The procedure described above would account for these differences in risk exposures.

3. You have a long position in a stock index. You are worried that the market might crash soon and are considering protecting your position by either (1) using a stop-loss order or (2) a put option. What are the differences between the two approaches? Are they the same if the stop-loss level and put option strikes are the same?

A stop-loss will become a market order when the stock hits the specified level or below. However, even if you have a stop-loss at, say, £10 per share, there is no guarantee that you will actually be able to sell at £10. In a fast moving market, the price may jump and you might only get £9.

With a put option, you are protected against this type of gap risk. However, you will have to pay the option premium. The other difference is that a stop-loss will take you out of a position so you will not benefit from any subsequent rebound in the price while you would still have the upside with a put option. The tighter you set the stop-loss, the greater the chances that you will be taken out of the trade.

In theory, you could dynamically replicate a put option by selling part of your position as the price falls, but in practice you are not guaranteed that you can adjust your hedge continuously so are once again exposed to gap risk.

Fixed Income & Currencies

1. What is LIBOR?

LIBOR is the London Interbank Offer Rate. It is the rate at which banks are willing to lend to one another on any given day for a range of different maturities.

2. Explain the LIBOR Scandal to me

The LIBOR scandal refers to the manipulation of the daily LIBOR (London Interbank Offer Rates) rates by a range of banks that colluded to keep the rates either lower or higher than they actually should have been to earn a profit on derivatives positions.

USD 450 trillion worth of financial securities are based on these rates, which has made it one of the biggest financial scandals in history and, since, the process of determining LIBOR rates has changed from banks' giving daily estimates to LIBOR rates being based on actual daily transactions.

3. What is a convertible bond?

A convertible bond is a bond that the holder can convert into a specific number of common shares of the issuing company at a predetermined conversion price. Convertibles are often issued by high growth companies with lower credit ratings.

4. What is a carry trade?

A carry trade is a popular trade in the currency markets. To put on a carry trade the investors borrows money in a currency with a low interest rate and invests it in a currency with a high interest rate. As long as that interest rate differential doesn't shrink, the trade is profitable.

A popular carry trade is borrowing in yen, which has had historically low interest rates for a long time, and investing it in higher yielding currencies such as the Australian dollar or the South African rand.

5. What is the risk-free rate?

The risk-free rate is a theoretical rate of return that an investor would get if the investment would carry zero risk. In reality, there is no such thing as a risk-free rate but for securities pricing purposes US Treasury securities are usually used as the risk-free rate.

6. How does inflation affect bond prices?

Inflation has been low in developing economics in the last 10 years that it has not been a major influencing factor in bond prices, but generally speaking if inflation is higher than the yield on a bond its price will drop as investors will move out of this bond as it has a negative real return.

7. What factors affect bond prices?

Interest rates, supply and demand, inflation, change in the credit rating, and lately also quantitative easing.

The prices of bonds are most affected by changes in benchmark interest rates and supply and demand. If benchmark rates are cut, yields on bonds will decrease and prices will increase. Supply and demand are, like in any market, also a big driver. If there is a lot of new issuance of bonds in a particular sector, prices of existing bonds in that sector will drop as many investors will put money into the new issues and because the issuing companies now hold higher levels of debt.

A drop in a bond credit rating will affect its price negatively, especially in the high yield bond space, as the issuing company is now perceived as less likely to be able to repay their debt in full and is therefore a riskier issuer.

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price will drop as investors will move out of this bond as it has a negative real return.

A big influential factor of bond prices in recent years have been the quantitative easing measures imposed by central banks in the US and Europe, where bonds have been bought by the central banks to “pump money into the system”.

8. What is a callable and puttable bond?

A callable bond is a bond with an embedded call option. That means that the issuer has the right but not the obligation to call the bond at a premium on the bond’s call dates. Calling a bond makes sense for an issuer if they can issue new bonds at a lower interest rate in the current market environment.

A puttable bond gives the holder the right to demand early repayment of the principal on specific dates.

Derivatives

1. What is a derivative security?

A derivative is a financial security with a price that is dependent on an underlying asset or a basket of underlying assets. Derivatives are used primarily to hedge risk exposure and to take speculative bets using leverage. Examples of derivatives include Futures, Forwards, Options, and Credit Default Swaps.

2. What is a forward contract?

A forward contract is an over-the-counter financial derivative contract where two parties agree on that the buyer will purchase an underlying asset at a specific price at a predetermined future date. Forward contracts, also known as forwards, are particularly common in the currency market as they are a popular currency risk hedging tool for corporations.

3. What is a futures contract?

A future contract functions in the same way as a forward contract with the only difference being that futures are standardised and trade on exchanges. Futures are particularly common in the commodities market.

4. What is an option?

An option is a financial derivative that gives you the right but not the obligation to buy or sell an underlying asset at a specific price

on or before a specific date. Options are popular derivatives in the currency markets, the commodity market and on the stock market. Options are often traded OTC (over-the-counter) as opposed to on an exchange, which allows options to be tailored specifically to the needs of the buyer of the derivative. Options that trade on an exchange are standardised.

5. What is a CDS?

CDS stands for credit default swaps and they function like a form of insurance on loans or bonds. They were originally created as hedging tools for banks to hedge their loan books. Over the years, however, CDS have become a speculative tool that have been said to have fuelled the credit crunch in 2007 and the financial crisis of 2008 as some investors (primarily hedge funds) have bought CDS of publicly traded companies that were said to be in financial distress (incl. Bear Stearns and Lehmann Brothers for example), which has said to have played a role in their downfalls as their creditworthiness became more and more questioned as the price of their CDS rose.

As a general rule, the higher the price of a company's CDS, the higher the default risk of that company.

6. What is a binary option?

A binary option is a derivative that allows you to bet on the price of an underlying asset, such as a stock, a currency pair or a commodity, to end up either higher or lower after a predetermined time frame. For example, you could bet that a US stock index closes higher within a 10-min time frame just after positive US economic news has been announced.

Binary options have become popular in the retail trading space recently but have been used for currency hedging purposes in the institutional market for much longer.

7. What is the difference between an American and a European option?

American-style options can be exercised at any point in during before the option's expiry whereas a European-style option can only be exercised at expiry.

8. What is basis risk?

Basis risk refers to the risk that the value of a derivative contract does not move in line with the underlying asset. This is especially an issue when you are using derivatives to hedge as your hedge will

be off in that case and an adverse move in asset prices could end up costing you more than expected.

Markets & Economics

1. What do traders do and how do they make money?

Traders are there to provide liquidity and pricing to clients and to manage the risk of the bank's trading books, while generating a trading profit for the bank. Traders make money by buying securities at a low price off one client and selling them again at a higher price to another client, thereby charging both clients the "bid/offer spread".

The specific roles of trading will vary depending on the asset class they trade. A spot FX trader, for example, will trade very actively due to the volatility and speed of the currency market. While a high yield bonds trader, on the other hand, will execute substantially less trades each day as the high yield market or a lot less liquid. Whereas structured derivatives traders, for example, may only execute one trade per day or only a handful each week.

2. Make me a market on Gold.

Take the current gold price, let's call it 1,500 and add bid/offer spread on both sides. So, a market for gold could be 1,499.50/1,500.50.

The interviewer then might say "*Ok, I hit you in 10 million at 1,499.50. What is your market now?*" The answer would be 1,499/1,500 assuming you want to keep the same bid/offer spread.

3. Where is the S&P 500, Dow Jones, EUR/USD, 3-month LIBOR, Fed Base Rate, US 2 and 10 year, Oil, Gold now?

Check these rates on the morning of the interview and note them down so you can have a look at them before you step into the interview. Questions like these get asked to see if you are following the markets and/or to see if you have adequately prepared for the interview.

4. What does the stock market tell you about a country?

A country's stock market is to some degree a reflection of the country's economy. Large developed and politically stable economies have mature stock markets with high trading volumes and a long list of publicly traded companies with high market capitalization.

Small emerging markets economies, on the other hand, have small exchanges with few listed companies and low trading volumes.

5. Pitch me a trade idea.

Choose an asset class that you are knowledgeable about and pick a trade that you would personally put on. The good thing with a trade idea is that it doesn't have to turn out to be right. It just needs to have thorough reasoning behind it.

An example of a trade idea would be to go long US stocks vs. short European stocks, if you believe that the US economy will do well under Trump whereas Europe will suffer from Brexit and potential other countries leaving the EU. You could set this trade up being buying an S&P 500 ETF and buying a Short Eurostoxx ETF for example.

6. What is the fear index?

The so-called "fear index" refers to the CBOE Volatility Index, in short "the VIX". In simple terms, the VIX shows how volatile equity options traders believe the stock market will be in the short-term. It is an index computed using S&P500 put and call options prices and shows us the 30-day implied volatility of the S&P500.

The more fear there is the market, i.e. the more volatile option traders believe the market will be, the higher the VIX index. During times of market sell-offs the VIX spikes, while during slow bull markets the level of the VIX will be low.

7. What is central bank intervention?

A central bank intervention refers to the interference of a country's central bank in its financial or currency markets. A common central bank interference that currency traders are well aware of is the Swiss National Bank interfering in its currency market to maintain the level of the Swiss franc at a price level that is beneficial to Switzerland's economy.

Another example of a central bank intervention would be the quantitative easing program by the European Central Bank, where the central bank has been buying up bonds to "pump" money into Europe's financial system.

8. Why can't traders use their bank's own money (proprietary trading) to trade any more? Is it likely to change in the future?

Proprietary trading has "effectively" been banned with the Volcker Rule, which is part of the Dodd-Frank Act, passed after the financial

crisis of 08. The Volcker Rule states that commercial banks are not allowed to prop trade using the bank's (i.e. depositor's) money as this is believed to have been one of the driving factors of the financial crisis that led to the banking bail-outs. Having said that, the Volcker rule has not yet been imposed on banks.

While large banks still engage in proprietary trading to some degree, the majority of banks have closed their prop trading desks and are now focusing their capital markets businesses on client-focused activity such as capital raising in the debt and equity markets.

9. Do traders make more during volatile or calm periods?

Traditionally, traders make more in volatile markets as the bid/offer spread that clients are being charged increases and there are more opportunities to buy low and sell high. Having said that, if volatile markets are combined with illiquidity it is very hard for (sell-side) traders to make money as they can easily get stuck in positions that they can't get out of. This has become a big issue in the credit markets for example, which have become increasingly more illiquid in the last five years.

10. What is an ETF?

An ETF, which stands for exchange traded fund, is an index-tracking fund that trades on exchanges in the same way stocks do. They have grown in popularity in the last 10-15 years as they offer a low-cost solution for passive investing.

11. How would you invest 1 million pounds?

The right answer here is to invest the money in a diversified portfolio. Also, this question gives you the chance to show of your knowledge of different asset classes.

50% in US stocks (currency-hedged), 20% in high-yield bonds, 20% in REITS, 10% in investment grade corporate bonds. This would be quite an aggressive portfolio but makes perfect sense, as you are young and are able to handle volatility as you are investing for the long term (10-25 years+).

12. Is a weak currency good or bad for a company that sells its goods/services in to other countries?

A weak local currency is good for an exporting company as its goods/services become cheaper abroad.

This is also one of the reasons why countries sometimes engage in so-called "currency wars" where they attempt to weaken their local currency to make their exports more competitive in the international market.

13. What are the 3 types of traders on the market?

Execution traders are found on the buy-side (hedge funds, mutual funds, private banks). They execute orders given by portfolio managers or private clients. Execution traders traditionally don't put on risk trades as they only execute orders.

Flow Traders/Market Makers are the traders found at sell-side banks. They make market for clients and aim to generate a trading profit by buying low from one client and selling high to another.

Prop Traders used to be much more common at banks but that has declined substantially since the Volcker rule, which was part of the Dodd-Frank Act, was introduced. The Volcker rule, which is effectively a ban on prop trading by commercial banks, has not been invoked yet. Nonetheless, prop trading is now mainly found in proprietary trading boutiques and at hedge funds.

[Banks still prop trade and the rule was never officially introduced but I wouldn't mention that at an interview as it makes you sound "too smart for your own good" and, therefore, a potential risk to the bank.]

14. What does a high yield imply about a bond?

A high yield on a bond means that either the bond's issuer has a low credit rating or that the issuer has found itself in financial distress. In both cases the bond is riskier to hold than a comparable bond with a lower yield. The higher the bond's yield rises, the more its price drops (due to the inverse price/yield relationship). So, if doubt arises that a company will be able to repay its debt in full, the price of its bonds will drop and the yield on the bonds will rise.

15. Why are interest rates important?

Fundamentally, banks make money by charging borrowers X and paying its depositors $X-1$. The lower benchmark interest rates are, the harder it is for banks to earn a decent spread on their assets and liabilities.

Furthermore, interest rates affect the price of a range of financial securities for the purpose of speculation or hedging, as well as individual's savings and mortgage rates.

Low interest rates mean it is cheap for governments, corporations and individuals to borrow money. However, it also means lower returns for investors that are putting their money into fixed income securities.

16. Would you buy a municipal or government bond ceteris paribus (all things equal)?

Generally speaking, municipal bonds would be the better investment as they offer a higher return than government bonds. Having said that, it depends on the issuing municipal as the creditworthiness of different municipals within a country can greatly vary. The other factor that speaks for municipal bonds, if you are a US-based investor investing in US municipal bonds, is that returns on "munis" are tax free in the US.

17. What product interests you and why?

- REITs as they are one of the best performing asset classes and a good diversifier for the portfolio.
- Peer-to-peer lending due to the returns being higher than in the fixed income markets.
- High-yield bonds as they are historically a very well performing asset class despite their inherent risk.

[Here you should also state the products you would be interested in trading/selling and demonstrate your pre-existing knowledge about them.]

18. What is the relationship between the prices of stocks and bonds?

Generally speaking, the relationship between the prices of stocks and bonds is inverse. When prices of stocks go up, prices of (government) bonds go down as they have a negative correlation historically. The reason for this is when interest rates are high, investors pour their money into fixed income securities for a good return and out of equities. As interest rates decrease, investors move money from fixed income securities into equities as they can get a higher expected return there.

Having said that, correlations have the tendency to break down. That means that in some instances prices of bonds and stocks move in alignment. For example, this has been happening in the last few years due to quantitative easing, which has artificially pushed asset prices up across the board.

19. Explain the role that correlations play in the financial markets. Why are they important?

Correlations are important when it comes to diversifying your portfolio. If you want to diversify your risk, you need to invest in asset classes that don't correlate. For example, traditionally investment portfolio would be made up of stocks and bonds, which tend to have a negative correlation. You could also add commodities, such as gold and silver, to your portfolio for further diversification for example, as they have low correlations with stocks and bonds.

[What is also important to note is that correlations change and, especially when the market collapses, asset prices have the tendency to move in tandem.]

20. What was the "Brexit" referendum's affect on the British pound and why did it react this way?

The day the result of the "Brexit" vote was announced Sterling dropped from 1.48 to 1.32 and in the following months hit a low of 1.21 against the US dollar. The reason for that is that economists in the UK and abroad have warned that a "Brexit" would have strong negative effects on the British economy, which, in turn, affects the value of the British pound.

As currencies are the fastest asset class to react to economic and/or political changes, the pound dropped sharply as the results were announced.

21. Why do you want to work as a trader/sales person?

Trader:

Example answer: I have been trading with my own money for several years and I have really been enjoying it. Working with charts, following the news and discussing the market with peers is something I really enjoy so working in a trading role feels like a good fit for me.

Another good reason to mention is that it is a highly results-oriented environment and that would enable you to track your performance day to day in a very measurable way.

Sales person:

Example answer: I want to work in sales as there I am in the middle of the action, acting as the middleman between the bank's clients and the bank's traders. I am good at dealing with people and managing relationships so I think that is a role that will suit me. Also, I like the variety that you find in a sales job in terms of going

to meetings, entertaining clients, building relationships and executing client orders.

[Provide examples of when you had to deal with people and/or manage them].

22. Why do you want to join banking now as opposed to going into tech for example?

Despite the fact that the banking industry has shrunk since the 2008 financial crisis, working in a bank you are still at the epicentre of the global financial system and that's not going to change. That makes it the ideal place to learn about what determines political decisions, economic policies and asset prices in the global markets but, also, lets me play my small part in the global financial system.

[Here you need to add your personal motivation as to why you want to work in banking, which is very specific to each person. As you are applying for a role in banking you will know your motivation behind it. Just ensure that you come across as someone who really wants to work in banking and not someone who will interview at Facebook the next day.]

23. Why did the financial crisis of 2008 happen?

The 2008 financial crisis occurred due to a number of different factors. In a long-term low interest rate environment banks were able to borrow money cheaply, which they then used to invest in high yielding mortgage-backed securities using leverage. This strong demand for mortgage-backed securities, including MBS, CDOs, fuelled housing market prices and increased lending to so-called subprime borrowers.

The access to cheap loans and mortgages fuelled the housing bubble in the US, which came to burst in 2007 when interest rates were increased and suddenly many borrowers, especially from the subprime segment, were unable to pay their mortgages. This caused banks to reassess their risk exposure in the mortgage-backed securities market, which was originally priced wrongly as credit rating of these derivatives did not adequately represent their riskiness.

When banks realized how big their exposure to the imploding US housing market actually was it was too late for some, like Bear Sterns and Lehmann, while others had to be bailed out by their governments to remain solvent.

24. What is quantitative easing?

Quantitative easing, also known as QE, is a form of monetary policy where Central Banks pump new money into the financial systems by creating new money electronically to purchases assets such as government bonds and other high-rated bonds. This increases the total amount of funds in the financial system. Making more money available is intended to encourage banks to lend to businesses and private individuals. This process, in turn, aims to directly increase private sector spending in the economy to boost GDP.

25. What is the current account?

A country's current account is a measure of its economic well-being. It is computed by adding a country's net exports to a country's net income from abroad and its net current transfers. Countries that have a current account deficit are net borrowers from other countries while those who have current account surpluses are net lenders to the rest of the world.

26. Is it ever optimal to exercise an option before expiry? Or to convert your bond into equity (convertible bonds)?

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PART II | EXTENDED EXPLANATIONS

1. What are the option Greeks?

The Greeks refer to the sensitivity of the value of an option to changes in a given parameter while holding all the other parameters fixed. The most important Greek is the option delta, which is the sensitivity of an option's value to changes in the underlying asset price (or the partial derivative of the option value with respect to the underlying asset price).

Similarly, vega is the sensitivity to volatility of the underlying; theta is sensitivity to time; and rho is the sensitivity to the risk-free interest rate. In addition, we can define gamma as the sensitivity of

the option delta to changes in the underlying asset price (or the second partial derivative of the option value with respect to the underlying asset price). Gamma is also called convexity.

The Greeks are used in practice to measure and hedge the risk of portfolios of derivatives.

2. Explain bond convexity to me.

The price of a bond changes with the level of interest rates. This sensitivity is referred to as the duration of a bond or the percentage change in the bond value for a unit change in rates (or yields). Furthermore, the duration itself changes with the level of rates. Convexity measures this sensitivity.

Another way to think about these measures is that duration is a linear measure of price sensitivity related to the first derivative of the bond price with respect to interest rates while convexity is a measure of curvature related to the second derivative of price with respect to interest rates. Convexity together with duration is used to manage the interest rate risk in bond portfolios and becomes more important when considering large changes in interest rates.

Plain vanilla (i.e. those without embedded options) bonds have positive convexity. However, bonds with embedded options such as callable bonds and mortgage-backed securities can have negative convexity over certain ranges of interest rates.

3. What is quantitative easing and how do markets react to it?

Quantitative easing is monetary policy involving the large-scale purchase of financial assets financed by issuance of central bank reserves. Central banks resorted to this unconventional form of monetary policy in recent years as their primary policy instrument of overnight interest-rates neared the zero lower bound.

Injections of money via asset purchases into the economy are intended to raise asset prices and lower the cost of obtaining funds. It can also increase the wealth of asset holders and thus increase spending and nominal demand in the economy. A key distinction between quantitative easing and "printing money" is that with quantitative easing there is generally a stated intention to eventually reverse the policy and reduce the accumulated stockpile of bonds and other assets by selling them off (or not replacing bonds that have matured) when the economy has sufficiently recovered.

In the period during and after the global financial crisis, the Federal Reserve, Bank of England, European Central Bank, Bank of Japan, and other central banks engaged in quantitative easing involving the purchase of assets, variously including long-term government bonds, corporate bonds, agency bonds, and equity ETFs and REITs.

While isolating and measuring the impacts of quantitative easing have been challenging tasks, research suggests that it lowered government and corporate bond yields and increased stock prices as well as improved measures of market liquidity and systemic risk.

4. What is the three type of traders on the market?

We can distinguish between three broad categories of market participants. Hedgers use derivatives to reduce the risk from future changes in some market variable (such as a commodity price, stock price, foreign exchange rate, or interest rate). Speculators use derivatives to make directional bets on markets. Arbitrageurs take offsetting positions in two or more instruments to lock in a profit.

An example of a hedger is a commodity producer (say a farmer) or user (say an airline) that faces volatility in prices and uses derivatives to reduce their exposure to commodity price fluctuations. Reducing price risk can help hedgers better manage their business operations. Speculators take directional positions and can use derivatives to obtain leverage, which can magnify gains as well as losses. Arbitrageurs seek to make riskless profits by simultaneously trading in multiple markets or instruments. By their trading activities they help to keep market from becoming mispriced. The classic example of arbitrage is to simultaneously trade the same instrument in two different markets when prices deviate and lock in a profit by buying low and selling high. In practice these opportunities can be rare and arbitrageurs often take some risk (for example by trading two similar, but not identical instruments).

5. What is basis risk?

Basis risk is the risk that a hedge instrument will not move in line with the exposure that is being hedged. For example, we define the basis in the context of futures as:

Basis = spot price of asset being hedged – futures price of contract used

If the asset being hedged and the asset underlying the futures are the same, then the basis should go to zero as we approach the expiration of the futures contract. However, since futures are not available for all dates, it is not always possible to perfectly hedge an

exposure. Furthermore, futures are not available for every asset that we want to hedge and we may need to use futures on some other asset that we expect will be highly correlated.

6. What does a high yield imply about a bond?

The yield-to-maturity (YTM) of a bond is the internal rate of return of an investor who purchases the bond at the market price assuming that all coupon and principal payments are made on schedule. In other words, discounting the bond's cash flows at the YTM will, by definition, give a present value equal to the market price of the bond.

It is important to note that fairly priced bonds with the same maturity date, but different coupon rates can have different YTM's. This "coupon effect" means that yield alone cannot be used as a measure of relative value between two bonds. The bond with the higher YTM is not necessarily the better investment since YTM depends on the amount and timing of cash flows together with the shape of the term structure of interest rates.

If two bonds have identical promised cash flows, the difference in YTM's will reflect differences in the current market prices of the bonds. The cheaper bond will have a higher YTM. If the bonds have different issuers, we could infer that the one with the lower price (and hence higher yield) is perceived by the market to have higher risk of default assuming fair pricing. In this case the higher yield is compensation for expected default losses as well as any premium for taking default risk.

7. What is delta hedging? How do you go about it?

Delta hedging refers to hedging the delta risk of a derivative (or portfolio of derivatives) by taking offsetting positions in the underlying asset. Recall that the delta of a derivative is the sensitivity of its value to changes in the price of the underlying.

The delta of a call option, for example, is positive since it becomes more valuable as the price of the underlying increases. Suppose a call option on a stock has a delta of 0.5. In order to delta hedge the option, we would need to short 0.5 shares of the stock per option. The resulting portfolio would have delta equal to zero as the increase in the call value associated with an increase in the stock price would be offset by the loss on the short position in the stock (and similarly for a decrease in the stock price).

As the stock price changes, the delta of an option changes so the hedge needs to be adjusted in order for the portfolio to remain delta hedged (or delta neutral). This process of adjusting the hedge over

time is called dynamic hedging. In practice, more frequent adjustments result in smaller hedging errors, but incur higher trading costs.

8. What is the Black-Scholes model and what are its assumptions?

The Black-Scholes-Merton model is a mathematical model that gives the theoretical price of a stock option given the volatility (assumed constant) and price of the underlying stock, the risk-free interest rate, and the specification of the option contract. The model assumes an idealized world with no trading frictions (such as transactions costs, short-selling constraints, restrictions on trading continuously) and most importantly the absence of arbitrage (or riskless profits).

The underlying argument for the model relies on being able to replicate the payoff of a stock option at maturity by holding a portfolio of the underlying stock and the risk-free bond and adjusting the portfolio weights over time (hence the need for the no trading frictions assumption). Since the payoffs of the option and the replicating portfolio are equal at maturity, the assumption of no arbitrage implies that the option value should be the same as the value of the replicating portfolio today. Notably, no forecast of the future stock price is needed in this argument.

The Black-Scholes-Merton model forms the basis of derivatives pricing and risk management and has been extended in many ways to cover various assets and types of options as well as relaxing the assumptions to allow for non-constant volatility.

9. What is the standard deviation of 1, 2, 3, 4 and 5?

The question is somewhat ambiguous. One possibility is that the set of numbers is a sample and we want to estimate the standard deviation of the population. A second possibility is that the set of numbers represents the sample space with some probability assigned to each outcome. You need to ask for clarification.

If the numbers are a sample, then the sample standard deviation is the square root of the sum of squared deviations from the mean divided by the number of observations n . The mean in this case is 3 and the standard deviation is $\sqrt{2}$. (You could also divide by $n-1$ instead of n to adjust for small samples in which case your answer would be $\sqrt{2.5}$. Note that the adjustment makes the estimator for variance unbiased, but does not make the estimator for standard deviation unbiased.)

If the numbers represent the sample space, the standard deviation is given by $\sigma = \sqrt{E[(X - E[X])^2]}$ where E is the expectations. To calculate this quantity, you also need to know the probabilities for each outcome to calculate the expectations. Suppose the interviewer tells you to assume an equal probability for each number. Then we obtain $\sigma = \sqrt{2}$. Note that the answers need not be the same as before if the probabilities of the outcomes were different.

10. Here's a two-sided coin. I will pay you £1 if the coin lands on its' head.

- a. How much would you pay to take this bet? Would your answer change if you were risk neutral (i.e. neither risk averse nor risk loving)?**
- b. How much would you pay if I first toss the coin three times with the result HHH (three heads)? Assume in this case that you are risk neutral.**

In (a), the amount you would pay depends on your assessment of the probability of heads, p , and your risk aversion. Suppose initially that you are risk neutral. Then you would assign a value to the bet equal to its expected payoff, which in this case is p pounds. However, you were not given the value of p . You could use $p=0.5$ by simply assuming that the coin were fair. You might also have a different set of prior possibilities in mind. To be precise, p is now a random variable and your prior is the probability distribution for p that captures your beliefs about the coin.

You are being asked how you would value the bet so any justifiable set of assumptions would be fine. Since you are given no information that would make you favor the probability of heads over that of tails, you might make your prior distribution for p symmetric around 0.5. One possibility is that you think p is uniformly distributed over the interval $[0, 1]$. Another possibility is that you think it is most likely a fair coin so that the distribution of p has a mode at 0.5 and then declines as you go towards 0 and 1. As long as your prior on p is symmetric around 0.5, the expected payoff is 0.5 pounds, which is the most that you would be willing to pay if you were risk neutral.

What if you were risk averse, which is more typical? In that case you don't like taking even fair gambles and would value the bet at less than 0.5 pounds. If you were risk loving, you would be willing to pay more. Arriving at a precise number would require specifying your prior distribution for p and your utility function to capture your level of risk tolerance. The important point is to realize that your risk aversion impacts how you value the bet.

In (b), we assume that you are risk neutral so you would be willing to pay up to the expected payoff for the bet. Compared to part (a) in which you had no information about p , you know that three tosses resulted in HHH. How would you revise your assessment of p , if at all?

The answer depends on what you believed initially about p . If you were absolutely convinced that the coin were fair, you would still continue to believe that the coin is fair after three heads (or indeed after any number of consecutive heads). However, if you thought p had some other prior distribution, you would increase your assessment of $p > 0.5$ versus $p < 0.5$ based on seeing three heads. How much you adjust your assessment of p depends on how precise your prior distribution was. If you can specify your prior distribution for p , you can use Bayes rule to compute your posterior beliefs about p (that is, your updated beliefs after seeing three heads). We won't go into the technical details here. However, the key point to make when giving an answer is that you would be willing to pay more than when you assumed you were risk neutral in part (a) after seeing the evidence since you revised your estimate of p to be somewhat higher.

One final comment is that traders need to be open to the possibility that their initial assessment of a trade was wrong and update their beliefs in the face of contrary evidence. If the interviewer asks how your answer would change if you observed an increasing number of consecutive heads before taking the bet, you had better be updating your p higher! In other words, don't be the person asserting that you expect $p = 0.5$ even after seeing 20 consecutive heads since you learned in your introduction to probability course that coin flips are independent and seeing a run of heads doesn't alter the odds of the next toss (which is physically true, but is not quite what is being asked here).

11. I will deal you two cards from a standard 52-card deck. What is the probability that you get two Aces?

We have $P(\text{both aces}) = P(\text{first card is Ace}) \times P(\text{second card is Ace} \mid \text{first card is Ace})$. Plugging in the numbers gives the answer $P(\text{both aces}) = 4/52 \times 3/51 = 1/221$. The chance of getting an Ace on the first card is straightforward since there are 4 Aces out of 52 cards. Conditional on the first card being an Ace, there are now three Aces left out of 51 cards. The general formula for the probability of two events A and B both occurring is given by $P(A \cap B) = P(A) \times P(B|A)$. In the formula $A \cap B$ is the event that both A and B occur and $B|A$ denotes the event B conditional on event A having occurred.

12. Tell me a contrarian (i.e. non-consensus) view that you have on the stock market. What about for the bond market?

In asking this question, the interviewer wants to know (at least) two things. First, have you been following markets and know what the consensus is? Second, do you understand that the consensus expectation about the future is already incorporated into today's asset prices? This type of question very quickly separates the strong candidates with genuine interest in the markets from the weaker ones.

The question is very open-ended and you could give any number of sensible answers depending on what's currently happening in the markets. If you say that you are more bullish on UK equities over the next year than the consensus, however, you better be able to back that up with some argument in which you disagree with the mainstream.

To organize your thoughts, you might think about the key inputs that stock and bond investors consider such as earnings, monetary policy, inflation, economic growth, and sentiment. The market expectations for all of these are closely tracked and generally come from surveys or are extracted from the prices of traded instruments. Consensus earnings expectations are obtained from sell-side analysts and are widely reported both for individual stocks and for indices. Expectations of central bank policy rate changes can be calculated from interest rate futures. Inflation expectations are available from various surveys of economists as well as traded inflation swaps. Sentiment is tracked by various surveys of consumer and business confidence.

In order to have a contrarian view, you generally must disagree with the consensus on some of the key inputs. This sounds obvious, but many interviewees will say something like "I think stocks will go up since the Fed will cut rates." Then after pointing out that Fed funds futures are already pricing a certain number of cuts over the next year, they don't know what to say. Or else they have enough awareness to say "I think the Fed will cut rates by more than the consensus," but then stumble when asked why they think that. The question is difficult precisely because the all the conventional, common sense arguments have been incorporated into the consensus opinion.

13. Tell me about the shape of the yield curve.

The yield curve gives the relationship between interest rates paid on bonds and their maturity. (This description, of course, is very loose. What bonds? What rates? Here we stick to a high-level discussion.)

The shape of the yield curve can take many forms including upward sloping (i.e. yields on longer-term bonds are higher), downward sloping, or something in between. The typical shape of the yield curve is upward sloping.

What can account for these various shapes? Suppose we are considering government bonds, which as a first approximation don't contain credit risk. Part of the answer is that long-term rates are influenced by market participants' expectations of future short-term rates. If the path of short-term rates is expected to be increasing, the yield curve will tend to be upward sloping and vice versa. This explains why bond investors pay such close attention to central bank deliberations about monetary policy.

Another factor that impacts the yield curve is the risk of inflation. (Non-indexed government bonds don't have default risk like corporate bonds do, but they are still subject to inflation risk.) In order to compensate risk-averse investors, bonds yields contain a risk premium, which can vary with maturity. Finally, there could be supply and demand effects as governments change the maturity structure of their debt or engage in large-scale purchases of government bonds (i.e. quantitative easing).

When the economy is strong, yields on longer-term bonds tend to be higher than those for shorter-term bonds and the shape of yield curve is upward sloping. A very steep yield curve suggests that investors expect rapid economic growth. This situation arose, for example, in the US in 2002 as the Fed started to cut interest rates following the 2001 recession and long-term bond yields increased with stronger market expectations of growth and inflation.

When the economy activity is weak or expected to weaken, the yield curve can become downward sloping (or inverted). Since long-term rates reflect expectations for the path of short-term rates, an inverted curve suggest declining future rates, which is consistent with expectations of weakening activity. Some research suggests that an inverted yield curve can predict recessions and serve as a leading indicator of economic activity.

14. Tell me about the term structure of equity.

While the term structure of interest rates is well known, the term structure of equity is a feature of the equity market that has only gotten wide attention in the past 10-15 years. As with any other asset, including bonds, stocks can be valued as the present value of expected future cash flows discounted by the appropriate risk-adjusted rate. The simple approach would be to use a constant

discount rate for all future dates (or alternatively a constant equity risk premium or spread over the risk-free interest rate curve).

The introduction of dividend futures for equity indices such as the S&P 500, Nikkei 225, and Eurostoxx 50 allowed traders to take bets on the dividends paid by the companies in the index over the life of the contract (generally between 1 to 10 years). Trading these futures and associated options prompted market participants to think more closely about what discount rates should be applied for equity cash flows at various maturities.

There is evidence in the historical data that equity risk premiums are higher for short-maturity claims to dividends than for the aggregate stock market. The phenomenon is observed across all markets, but the statistical evidence appears strongest in European markets, which have been the most liquid. Furthermore the volatility of equity yields is downward sloping with maturity and the betas of short-term dividend claims with respect to the market are low (around 0.5).

Why are these findings potentially significant for people not trading dividend futures? Stocks can have different cash flow profiles over time. This characteristic has been called "equity duration." Growth stocks are younger, faster growing companies and will tend to have increasing cash flows over time while value stocks will generate a larger proportion of their cash flows sooner rather later. In the cross-section of stocks, long-duration equities have generated lower average returns than short-duration equities and equity duration seems closely related to traditional valuation measures such as book-to-market.

15. What is the relationship between long-run economic growth per capita and long-run stock market returns across different countries?

The question is asking you to compare economic growth per capita and stock market returns across countries (or the cross-country correlation between growth and stock returns). It is not asking whether stock returns for a given country is higher in periods when economic growth is higher. Furthermore, the question is asking about stock market returns and not the aggregate market capitalization of stocks. For example, much of the growth in the aggregate market capitalization of the Chinese stock market over the past twenty years has come from IPOs (or investment of new capital) and not from stock market returns (or return on existing equity).

Looking at the long run historical data, we see that the cross-country correlation of per capital real GDP growth and real stock returns has been *negative*, both for developed and emerging markets. Part of the explanation for this counterintuitive finding is that consumers and workers have been the primary beneficiaries of economic growth and not the shareholders of existing public companies. Also in countries with high economic growth, there appears to be a tendency for companies to overinvest, which will increase economic growth, but can reduce earnings as increasingly less profitable (or even unprofitable) projects are undertaken.

16. You want to predict the direction of some market based on a trading signal. Your analysis shows that the signal is strongly correlated with future returns in the historical data. Is correlation enough for you to trade on this signal?

Yes, correlation can be sufficient to make predictions. The most common mistake is to believe that “correlation does not imply causation” (a true statement) means that causation is necessary for predictions. Of course, as a trader or market analyst you would like to know the causal relationships that drive market dynamics (more on this below). However, this knowledge is not necessarily required to make predictions.

A simple example illustrates this point. Smoking causes lung cancer. Smoking also causes people to huddle outside their buildings a few times during their workday. Does standing outside cause lung cancer? No.

But does the fact that we see someone standing outside his office building on a regular basis change our prediction of whether he will get lung cancer? (Assume that you can see the people standing outside their buildings, but not what they are doing.) Yes. The reason, of course, is that standing outside is correlated with smoking.

The approach of using correlations is widely used in machine learning models, which generally do not try to determine causality, yet are used to make predictions. When would knowing a causal relationship help? It’s necessary if we want to make some sort of change in the situation and want to predict the outcome. For example, what would happen to the economy if we change fiscal or monetary policy in some way? This is why macroeconomists are very focused on causal modeling.

In our example, suppose we observed that standing outside is correlated with higher rates of lung cancer. So we change our policy

and allow workers to smoke in designated smoking rooms inside the building. Would this decrease the incidence of cancer? Presumably not. In this case, using only correlations has led us astray since we did not understand the underlying causal mechanism. Nevertheless, in financial markets determining causal relationship is very difficult and the vast proportion of trading models relies on correlations instead.

17. Suppose the long-run historical stock market return in some country has been 8% per year. Under what circumstances is 8% the best forecast for stock returns now? Would you use an alternative method to forecast the stock index?

Using the historical mean is appropriate, for example, if the return distribution has remained stable over time and the returns are independent each year. This would be similar to a situation in which you were flipping a coin repeatedly.

Whether the first assumption of stable underlying conditions holds would depend on the country. If a country had been an emerging market for much of its history, but had recently joined the ranks of developed markets, the long-run historical mean might not be a good measure of expectations going forwards.

The second assumption is also potentially problematic. If stocks have undergone a long bull market and valuations are high, would we expect future returns to be low? Or would we expect the trend to continue and hence expect continued high returns? These are largely empirical questions, but simply using the historical average would imply that you are not allowing for trends or mean reversion in prices. What you observe in the data will also depend on your forecast horizon (e.g. one month, a year, five years).

What traders and investors typically do is use additional data beyond the historical returns to inform their views about the market. If we had information on the aggregate dividend-to-price ratio, for example, we could form a forecast of stock returns conditional on what the ratio is today. In practical terms, you might estimate a regression model of future returns on the dividend-to-price ratios. Then you could make a forecast based on the level of the ratio today. You could, of course, use any number of other signals.

Another good answer, which doesn't rely on historical prices, is to compute the implied cost of capital or the rate of return that equates the stock market's current value, which you have, with the present value of its expected future cash flows, which you must

forecast. If this sounds confusing, think of the internal rate of return (IRR) for a bond. The coupons and principal amounts are fixed so if we know the bond price today, we can compute its IRR. The implied cost of capital for stocks is analogous.

Of course, for stocks the future cash flows to investors (i.e. dividends or more properly all cash distributions) are not known in advance and furthermore don't have a fixed end point. The usual approach is to forecast aggregate earnings for the next few years (using your own forecast or perhaps consensus analyst forecasts) and then assume some long-term growth rate for all subsequent years. Then you need to convert your earnings forecast to a cash flow forecast by applying a dividend payout ratio. Once you have the forecast of future cash flows, the last step of solving for the implied cost of capital that equates the present value of the cash flows with today's stock market price is straightforward. The point of this exercise is to avoid relying on returns, which can be problematic as discussed earlier, by using a forward-looking estimate of aggregate market cash flows.

18. Should you buy an asset when its price dips? What is your thought process?

There is room for interpretation here so either ask for clarification or state the assumptions that you are making about asset class, investment horizon, and so on.

The key to answering this question is to understand that trades can be made for informational or non-informational reasons. If somebody knows some bad news about a company and sells its stock, he is selling for informational reasons. The price would fall since the news is bad and we would generally not expect the stock price to rebound (unless we had reason to believe that the market overreacted to the bad news causing the price to decline too much). If the bad news were not publicly known, it would require trading volume for the news to become incorporated into the stock price. However, if the bad news were publicly known, then prices could fall with little or no trading volume as all investors adjust their valuation of the stock downward.

On the other hand, if some fund were selling a stock in order to raise cash to meet a redemption request and not because it has bad news about the stock, it is selling for non-informational (or liquidity) reasons. Liquidity-driven trades, by definition, must be associated with trading volume. Other investors (call them "market makers") will buy the stock in exchange for compensation, which comes in the form of a lower purchase price.

As a trader deciding whether to buy on dips or not, you need to make a judgment on whether the price has declined for informational or non-informational reasons. If the price of the stock is falling on heavy volume and there is no bad news about the stock, you might infer that someone is selling his position since he needs to raise cash quickly. In this case, you could buy the dip and hopefully earn a profit for providing liquidity.

If a stock is falling and there is bad news about the company, you should not buy the dip unless you had reason to believe that the market has overreacted to the news.

PART III | THE TRADING GAME

A trading game is usually held at an assessment centre. Let's take a look at an example below, which has happened at Barclays Investment Bank in 2016:

There are 4 rounds (and 4 teams). At the beginning of each round your team has to make a market on the sum of 7 cards (a price at which you are willing to buy at and a price at which you are willing to sell at, with a spread of "one"), each numbered from 1 to 15. 4 cards are already given out, privately, to each team, so there are 3 cards which value's is unknown. At the end of every round, a card then gets "turned up". Meaning you have to adjust your quote every round, AND don't forget to take into consideration the hand you were given (the card you were given privately).

In making your markets you have to pay attention to two things: the current expected value of the sum of all cards, and the quotes that other teams are giving out. It's like poker: if someone keeps giving a high quote, they are likely to have a high number on their card. The Expected Value of a single card is $(15+1)/2$, so 8. At the beginning of the first round, the EV of the sum is $6*8$ (there are 6 cards unknown, all with an EV of 8) plus your card's value.

If your card's value is 5, then EV is $6*8+5=53$ so your quote should be 52.5-53.5.

General tips

- It is important for you to remain calm because it might get hectic. Explain your reasoning to team members if necessary. Back up everything you say, specifically why.

- Be active, and engaged. It's one of the most important things. You can either be the one announcing your team's quote (you just need to stand up, speak up and be confident) and accepting/rejecting quotes from other teams, or the one taking account of trades (putting down the price you sold/bought at and how many contracts) on a piece of paper. Take the responsibility.
- At the end your team will be asked to evaluate your performance. Do it if you can as it shows you are not afraid to speak up and do it intelligently.

Find out what's likely to happen at your AC

We have a number of reviews of assessment centres available at www.canarywharfian.co.uk/assessment-centres. You can filter by "Global Markets" so you only see the reviews of people who have done a Markets AC. It is also bank-specific, so you can gain insider information on what happens on the day & what to look out for.

PART IV | THINK LOGICALLY

You can be sure to come across at least one brainteaser during your interview process. It is important to be prepared for them. Luckily, there is a few, very common ones, that are listed below along with their possible solutions.

General tips

- Think out-loud. They will ask you how did you arrive at that specific number.
- Take your time. It's important that you stay relaxed, even when your interviewers are trying to pressure you.
- Think through the problem. What part of the question you are certain about? What part of the question are you not certain about?
- Don't focus too hard on the answer. They want to see your thought process, e.g. how do you deal with limited information.
- Whatever you come up with, back it up with reasoning. There is no one right answer: there are many possible solutions. As long as your assumptions are reasonable, and makes sense, you are fine.
- Do a reality-check, before coming up with your final answer.

1. You've got a 10 x 10 x 10 cube made up of 1 x 1 x 1 smaller cubes. The outside of the larger cube is completely painted red. On how many of the smaller cubes is there any red paint?

The cube is made up of 1,000 cubes (10x10x10). The cubes that are inside the cube (that is, cubes that have not one side that is visible from the outside) is 8x8x8, which is 512 (you can visualize it easily why it is 8x8x8). Since only the outside of the cube is painted, it means that if we subtract 512 (that is, the inside cubes) from the total number of cubes, we get the cubes that are painted (one cube has only two states: it is either painted or it is not). The answer is 488.

2. How many lightbulbs in London?

There's 10 million people living in London. Let's say that on average, 3 people share any one flat. Therefore, 10 million / 3, there's 3 million flats in London. Each flat has about 4 lightbulbs in them. The answer: 3 million * 4 = there is 12 million lightbulbs in London.

3. How many newborns every year in UK?

There is 60 million people living in the UK. The average city size must be about 40,000 people (an educated guess). For every 40,000 people, there is perhaps 1 hospital. So, in total, you have 60 million / 0.04 million that is 1,500 hospitals in the UK (reasonable, but seems a little too low; let's continue). In each of these hospitals, there is probably 2 rooms for newborn babies: each holding 30 babies. Assuming that these turn over in about 2 weeks, and there is 52 weeks in a year, that means per hospital you have $52/2=21$ turnover periods in a year and in each turnover period there was 60 babies. So $60*21=1260$ newborns in a year, in one hospital.

So $1,500 * 1260 =$ there is 1.9 million newborns every year in the UK.

Note that this is only one solution. There are many other, possibly much less complicated approaches.

[By the way, the total number of newborns in the UK in 2014 was 0.8 million.]

4. Why are manhole covers round?

They can not fall through the hole.
They can roll.
No sharp edges.

5. What's the easiest way to kill a giraffe without using a weapon?

Jump on its neck.

6. I have a 5 litre bucket, a 3 litre bucket & a hose, how do I measure 4 litres EXACTLY?

Fill the 3-litre jug:

- Take the 3-litre jug and put it in the 5-litre jug.
- Repeat until 5-litre jug is full and 3-litre jug contains 1 litre.
- Empty 5-litre jug, fill it with the 1-litre, fill up the 3-litre jug & put it in the 5-litre jug.
- $1+3 =$ the answer is 4.

7. I have 7 basketballs and 1 basketball that is slightly heavier than the rest (8 total) I also have a balance scale. How many times do I need to use it to find the heavier ball?

The answer is 3:

- Measure 4 versus 4 balls → the heavier side has the ball.
- Measure 2 versus 2 → heavier side has the ball.
- Measure 1 versus 1 → the heavier ball is your ball.

8. The light in my room is broken. I only have black & blue socks in my drawer. How many socks must I pull out to ensure I have a matching colored pair?

The answer is 3.

- At least 2 socks of the 3 must match.

9. I have 50 black & 50 white marbles & 2 buckets. How do I mix the marbles in such a way as to maximize my chances of picking a black marble from BOTH buckets.

Keep 1 single black marble in Bucket 1:

$$\text{PrBlack} = 1/1 = 100\%$$

Put the other 49 with the 50 white balls:

$$\text{PrBlack} = 49/50 = 49.49\%$$

10. You have a £1 bill and a £20 bill in your wallet...they were minted at the same time. Which do you eat if you had to?

£20 bill, if your hygiene is worth less than £19.

They change hands slower than 20 pound notes, which means less hands, which means less gross.

11. What is the degree difference between the minute hand and the hour hand at exactly 3:15?

In 15 minutes, the minute hand is always at 90 degrees from 12 o'clock (so pointing to 3 o'clock). Do we know the hour hand at 3:15? No, we have to find out, but at least we know where the minute hand is.

We know that from 12 o'clock to 6 o'clock it's 180 degrees, and there is 6 hours that is spent. Therefore, $180/6$ gives 30. It means that in one hour, the hour hand moves 30 degrees. We know that it's only 15 minutes that has past from the hour, so $15/60=0.25$, $0.25*30$ so it has moved 7.5 degrees.

Mental Math

The most common question in mental math is squaring double digit numbers. There is a simple trick to it. Here's the formula you need to use:

$$x^2 = (x+a) * (x-a) + a^2$$

Choose "a" so that one of the numbers you multiply with ends with a 0. For example:

$$16*16 = (16+4) * (16-4) + 4^2 = 20 * 12 + 16 = 256$$

Another example:

$$39*39 = (39+1) * (39-1) + 1^2 = 1521$$

Another one:

$$73*73 = (73-3) * (73+3) + 3^2 = 5329$$

You might also get other types of mental math calculations which will come down to your individual practice (additions, subtractions, multiplication, division). As you probably figured by now, your mental math skill will also be tested during answering brainteasers, it is not only when your interviewers directly pose a question to you.

Another important thing to note is that it is almost always easier to utilize shortcuts in your thinking. For example, if they ask you what is 1% of 15, you know it is 0.15 (move the decimal point to the left by 2 places, the number of zeroes in 100). Similarly, when asked 12% of 250, you go: 1% of 250 is 2.5, and they are asking 12%, so just multiply that by 12 and you get: 30. Easier, isn't it?

There are several apps available on the App Store to strengthen your mental calculation skill, which we highly advise you to practice with.

PART V | NUMBERS TO KNOW

It is important for all the market instruments below that you know their price action over the past 6-12 months. Memorize the specific trends (upward, downward or sideways), and additionally read up on the major news that affected their movement during that period.

Indices

Financial Times Stock Exchange 250 (FTSE): [Click Here To View](#)

Financial Times Stock Exchange 100 (FTSE): [Click Here To View](#)

Dow Jones Industrial Average (DJIA): [Click Here To View](#)

Standard & Poors 500 (S&P 500): [Click Here To View](#)

VIX (the fear gauge): [Click Here To View](#)

Currency Exchange Rates

EUR/USD: [Click Here To View](#)

GBP/USD: [Click Here To View](#)

USD/JPY: [Click Here To View](#)

Commodities

Gold: [Click Here To View](#)

Oil (London Brent): [Click Here To View](#)

Government Bond Yields (memorize both the 2 and 10-year maturity)

United States: [Click Here To View](#)

United Kingdom: [Click Here To View](#)

Germany: [Click Here To View](#)

Japan: [Click Here To View](#)

Other

Unemployment rate in the UK: [Click Here To View](#)

Inflation in the UK: [Click Here To View](#)

PART VI | GLOSSARY

Issuance

New issuance in the bond or equity space refers to new securities that companies or governments have issued on the market. As governments and corporations issue debt on a regular basis the term *new issue* is mainly used in the fixed income (bond) market.

Option

A contract giving the buyer the right, but not the obligation to buy/sell a certain quantity of goods for a specified price at a specified time. There are two types:

Calls: The right, but not the obligation to buy a specified amount of asset at a specified price (K as known as strike price) on a specified date (expiration).

Puts: The right, but not the obligation to sell a specified amount of asset at a specified price (K as known as strike price) on a specified date (expiration).

Forwards

A contract to buy/sell some quantity of an asset at an agreed price on the delivery date.

Bid/Ask

Securities will never trade on their mid price. They will always have a bid/ask price. That means there is a price at which market makers are always willing to bid (buy the asset) and a price at which they are always willing to offer (sell the asset). As an investor you are a price *taker* and have to "pay the bid/offer" when you want to trade.

Bond

Bonds are fixed income securities that function in the same way as a loan: the issuer/borrower sells its debt to investors, which receive interest payments, in the form of coupons plus and their invested principal back at the end of the bond's timeline (maturity).

In-The-Money (ITM)

The option can be exercised at a profit (keep in mind that you paid a premium for the right, so even though your option has intrinsic value you might still end up with a loss). Mathematically: $S < K$ for a put option (spot price lower than strike price), $S > K$ for a call option (spot price higher than strike price).

Out-Of-Money (OTM)

The option can *not* be exercised at a profit; you would realize a loss. Mathematically: $S > K$ for a put option (spot price higher than strike price), $S < K$ for a call option (spot price lower than strike price).

At-The-Money (ATM)

The option can be exercised with no profit or loss. Mathematically: $S = K$ (spot equals to strike price).

OTC

OTC is an acronym for over-the-counter and refers to securities and their derivatives that are not traded on an exchange. The terms of trades that happen over-the-counter are agreed upon by the counterparties specifically, and therefore are not standardized (it won't be trading on an exchange).

Derivative – A financial security that derives its value from another financial asset (the *underlying* asset).

Principal – The principal is the investment made in a fixed income security by the investor, which gets repaid at the end of maturity of the fixed income security.

Real return – The return on your investment minus the rate of inflation.

Spot FX

The spot FX market, as opposed to the forwards or futures market, refers to currencies that are traded on the day at an agreed price between two parties. They are trading immediately and so *on the spot*. They are a highly liquid market.

Stocks

Also known as shares or equities. Partial ownership of a company (whether public or private).

Time Value

Options' value is made up of two values: intrinsic and time value. Intrinsic value is the difference between the strike and the spot price at any given time. Time value measures the value of the time that is remaining until the contract expires. Even if let's say your call option is out-of-the-money, if there are months until expiration, there's still a chance that your option will end up in-the-money, generating profit for you: therefore, that time period is valuable. You would not want to give away that right, since it is not worthless.

Callable bond

A callable bond is a bond with an embedded call option. The bond issuer has the right but not the obligation to call the bond at a premium on the bond's call dates. He/she might decide to do this if rates increase in the market.

Puttable bond

A puttable bond is a bond with an embedded put option. One might buy a security like this in order to have the protection of being able

to sell the bond if rates increase (so that a higher return can be locked in afterwards).

Futures

Futures are derivative contracts that allow investors to buy or sell a specific financial asset at a specific future date and at a specified price.

IPO

IPO stands for Initial Public Offering and is the process when a company lists their stock on an exchange, and its shares become publicly tradable.

Leverage

Using leverage in the financial markets refers to using borrowed capital to conduct a financial transaction to increase the potential profit.

LIBOR

LIBOR is an acronym for the London Interbank Offer Rate. LIBOR is the rate at which banks lend to each other for different maturities. 3-month USD LIBOR is the most commonly looked at LIBOR figure.

Maturity

Maturity refers to the term of a bond or other fixed income security. For example, a 5-year 5% fixed semi-annual coupon bond has a five-year maturity.

Coupon

Refers to a bond's interest payment, which might come quarterly, semi-annually or annually depending on the structure of the bond.

Index

An indicator of the amount of investment into a particular asset class. Generally referred to stock indexes (as the FTSE 100).

Commodity

Can be energy-related (oil, gas, alternative), metals (industrial, precious, other) or agricultural (wheat, corn, soy, etc.). Materials that countries, companies & consumers use, therefore of high importance to the global markets.

Government Credit Rating

Ability for a government to pay its' debt off. Affects the yield, therefore the prices of bonds.

Ranges from junk (also known as high-yield) to investment grade. The higher the rating, the more secure (less chance of a company *defaulting*) the investment is.

Big credit rating agencies are Moody's and Standard & Poors.

Balance of Trade (similar to Current Account)

Exports less imports. The UK runs a current account deficit.

Janet Yellen

Chair of the Board of Governors at the Federal Reserve (central bank of the United States). The most important person in American monetary policy.

Mark Carney

Governor of the Bank of England.

Central Bank

A country's central bank manages a country's benchmark interest rates (which has an impact on consumption/growth in the economy), so has control over *money supply*. It often also acts as a regulator that oversees a country's financial system.

Mine

"Mine" refers to buying a security to a trading counterparty at a price that was shown by your counterparty, and will be used in voice trading or on instant messaging platforms such as Bloomberg Terminal.

Yours

"Yours" refers to selling a security to a trading counterparty at a price that was shown by your counterparty, and will be used in voice trading or on instant messaging platforms such as Bloomberg Terminal.

Cable

Cable is the nickname for the currency pair GBP/USD and comes from the fact that a cable was built across the Atlantic in 1866 to transmit currency prices between London and New York's exchanges.

Swissy

Swissy is the nickname given to the currency pair USD/CHF in the FX market.