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SCIENCE OF TRADING

WHO TAKES THE GREATER FINANCIAL RISK?

BY BEN SHELLSWELL AND RIA PANDIT

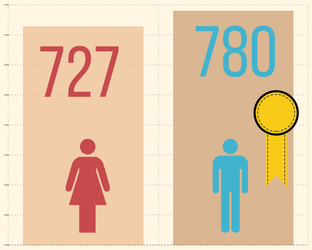
University of Southampton
Royal Holloway University of London
SEPnet

RELATIVE RISK INDEX

IN THIS PROJECT A RELATIVE RISK INDEX (RRI) WAS CALCULATED FOR A LARGE NUMBER OF CLIENTS. WE RATED OUR CLIENT BEHAVIOUR BASED ON HOW MUCH RISK THEY WERE WILLING TO UNDERGO WHEN TRADING. THE RRI WAS GENERATED BY GIVING EACH MEASURE CONTRIBUTING TO RISK A WEIGHTING, RANKING CLIENTS BASED ON THIS WEIGHTING AND FINALLY TOTALLING UP THE SCORE TO PRODUCE AN RRI OUT OF 100. THE MEASURES AND THEIR RESPECTIVE WEIGHTINGS ARE GIVEN IN FIGURE 1.

MEASURE	WEIGHTING
AVG DIST FROM CONTRA AND OPEN POSITION	7
NO OF SYMBOLS TRADED	15
SIZE OF LIMITS RATIO	15
POSITION OF LIMITS SPREAD	15
LENGTH OF TRADE (MINUTES)	20
VOLATILITY AT TIME OF TRADE	28

A GAME OF PATIENCE...



WHEN LOOKING AT THE TRADE LENGTHS THROUGHOUT THE DAY, WE FOUND THAT ON AVERAGE, MEN SPENT AN **ADDITIONAL 53 MINUTES** IN TRADE.

THIS MAY BE DUE TO TRADERS **RUNNING AWAY WITH THEIR LOSSES** OR **FORGETTING ABOUT TRADES PLACED**.

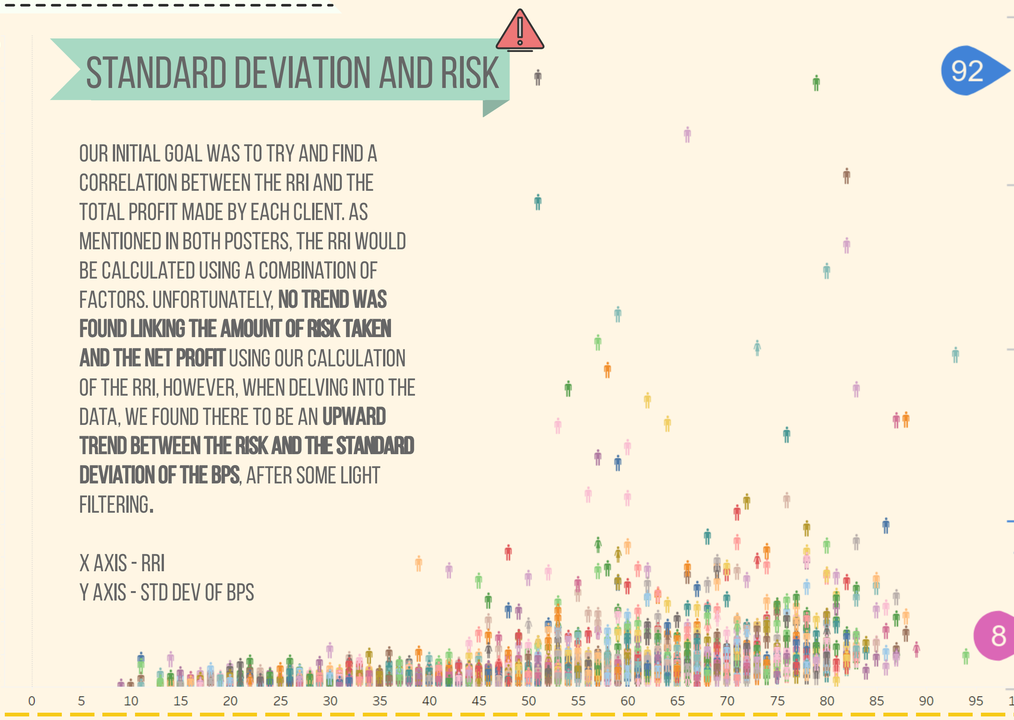
IF THE TRADERS **DON'T SPEND A LOT OF TIME IN TRADE**, THEY ARE CONSIDERED **LESS RISKY**. THEIR TRADES ARE NOT EXPOSED TO THE VOLATILITY OF THE MARKET.

IF THE TRADERS **SPEND A LOT OF TIME IN TRADE**, THEIR TRADES ARE MORE LIKELY TO SUFFER SIGNIFICANT LOSSES DUE TO THE VOLATILITY OF THE MARKET HENCE MAKING THE TRADERS **MORE RISKY**.

STANDARD DEVIATION AND RISK

OUR INITIAL GOAL WAS TO TRY AND FIND A CORRELATION BETWEEN THE RRI AND THE TOTAL PROFIT MADE BY EACH CLIENT. AS MENTIONED IN BOTH POSTERS, THE RRI WOULD BE CALCULATED USING A COMBINATION OF FACTORS. UNFORTUNATELY, **NO TREND WAS FOUND LINKING THE AMOUNT OF RISK TAKEN AND THE NET PROFIT** USING OUR CALCULATION OF THE RRI, HOWEVER, WHEN DELVING INTO THE DATA, WE FOUND THERE TO BE AN **UPWARD TREND BETWEEN THE RISK AND THE STANDARD DEVIATION OF THE BPS**, AFTER SOME LIGHT FILTERING.

X AXIS - RRI
Y AXIS - STD DEV OF BPS



92

ONE OF THE THINGS WE REALLY STRUGGLED WITH WAS MAKING OUR DATA AS FAIR AS POSSIBLE, BETWEEN THE TWO GENDERS. THIS WAS FOUND TO BE MORE DIFFICULT THAN EXPECTED DUE TO MEN DOMINATING OUR DATA BY 91.71% TO 8.27%. WE COMBATTED THIS BY VARIOUS FORMS OF NORMALIZATION.

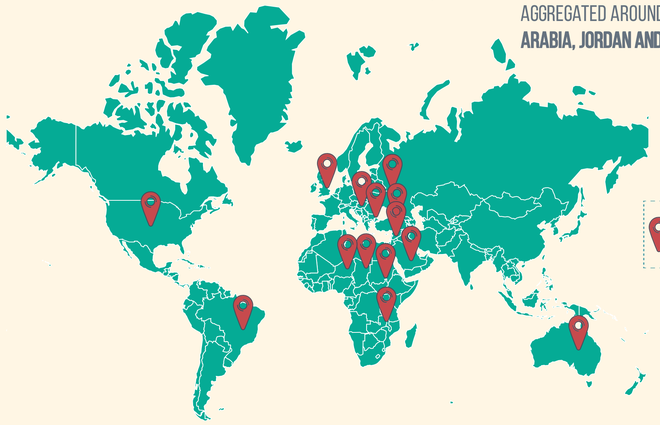
8

HOW FAR IS TOO FAR?

ONE OF THE COMPONENTS WE CHOSE TO INVESTIGATE WAS THE PHYSICAL DISTANCE FROM THE CLIENT TO THE CURRENCY THEY ARE TRADING IN. EACH COUNTRY HAD AN ASSIGNED CURRENCY, I..E THE UNITED KINGDOM AND GBP. THE DISTANCE FROM THE CLIENT TO THE CURRENCIES IN THE FX PAIR (BOTH OPEN AND CONTRA) WERE TAKEN AND AVERAGED. IT WAS SAID THE **CLOSER THE CLIENT WAS TO THE PAIR THEY WERE TRADING, THE LESS OF A RISK THEY WERE TAKING**. THIS WAS DUE TO ANY POTENTIAL LOCAL KNOWLEDGE WHICH THE CLIENT MAY HAVE.

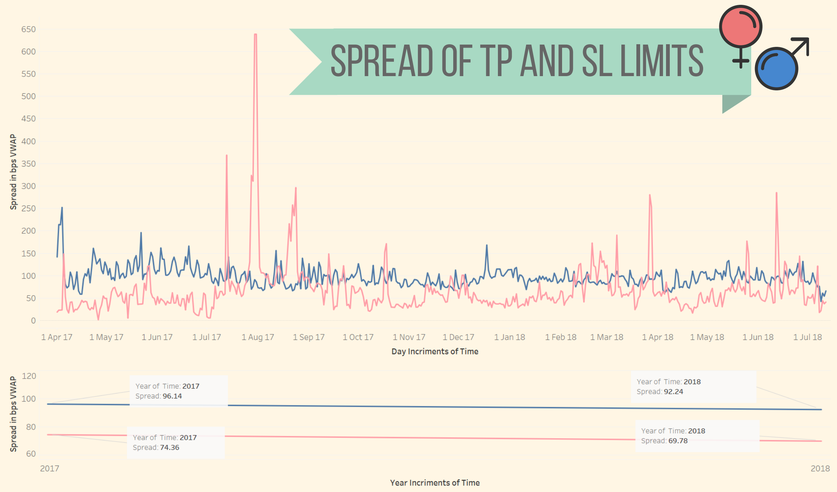
DO TRADERS JUST LIKE THE UAE WEATHER ?

ALTHOUGH THE CLIENT BASE CONSISTED OF **PEOPLE FROM ALL OVER THE WORLD**, THE MAJORITY OF THE WEALTH AND LARGE VOLUMES OF TRADES WERE AGGREGATED AROUND **SAUDI ARABIA, JORDAN AND THE UAE.**



LOCATIONS OF TRADERS

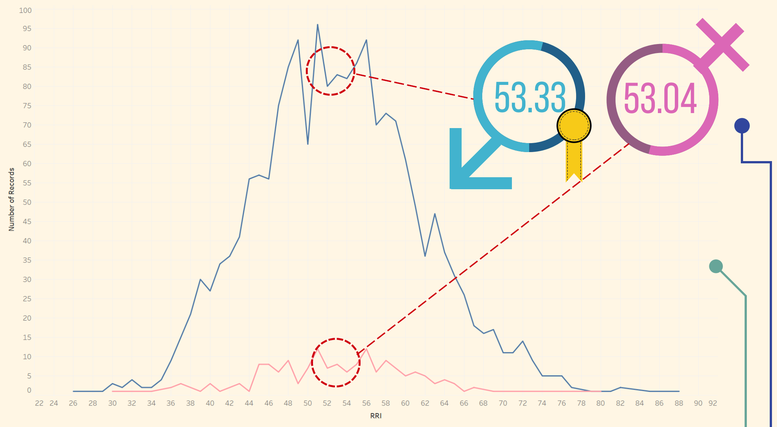
SPREAD OF TP AND SL LIMITS



FROM THIS, IT IS OBSERVED THAT REGARDLESS OF THE CURRENCY, IT IS SEEN THAT ON AVERAGE ACROSS THE YEAR **MEN** HAD A **LARGER SPREAD** OF **TAKE-PROFIT AND STOP-LOSS LIMITS**. ON THE OTHER HAND, ALTHOUGH **WOMEN** HAD A SMALLER TOTAL SPREAD OF LIMITS, THEY HAD A **HIGHER RANGE**, I.E. THEIR LIMITS VARIED MORE THROUGHOUT TIME. WITH THE WOMEN THERE ARE MANY SPORADIC PEAKS AND TROUGHS, WHICH, CONTRIBUTE TO A LARGER AVERAGE RANGE. THIS POINTS TO **MEN TAKING LARGER RISKS WHILST TRADING**, AS THEY HAVE A **LARGER SPREAD OF LIMITS**, THEREFORE MAKING THEMSELVES **MORE SUSCEPTIBLE TO LOSING MONEY**. **WOMEN** ON THE OTHER HAND LOOK TO BE **MORE INDECISIVE**, AS THEY HAVE A **HIGHER DEGREE OF VARIABILITY**, WHICH COULD POINT TOWARDS THEM BEING **WARIER OF TAKING LARGE RISKS**.

FINALLY...

LOOKING AT THE FINAL RESULTS OF THE RRI, IT CAN BE SEE THAT **MEN AND WOMEN HAVE RELATIVELY SIMILAR SCORE SPREAD**, WITH **MEN** ONLY BEING **MARGINALLY MORE RISKY**. THE RRI WAS DISTRIBUTED IN A GAUSSIAN PATTERN AS EXPECTED, WITH MOST PEOPLE HAVING A RISKINESS SCORE BETWEEN 35 AND 60.



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PROJECT BRIEF & INTRODUCTION

OUR PROJECT FOCUSED ON CREATING THE FOUNDATIONS OF A **MACHINE LEARNING** PROGRAM WHICH CAN PREDICT THE FUTURE TRADING BEHAVIOUR OF A CLIENT, BASED UPON ALL THEIR PREVIOUS TRADING DATA. THIS PROJECT WILL PRIMARILY PUT EMPHASIS ON THE LEVEL OF **RISK** THE CLIENTS TAKE.

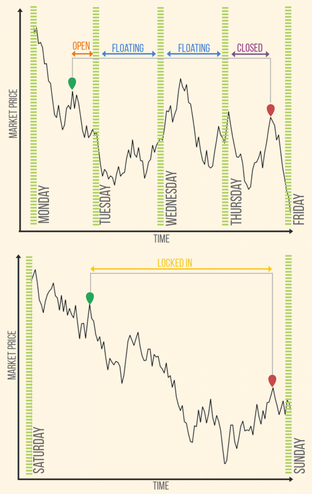
OUR DATA

MetaTrader 4

MT4 IS A PLATFORM WHICH CAN BE USED TO PLACE TRADES ON THE **FOREX** MARKET. WE USED THIS INITIALLY TO GET A FEEL FOR HOW FOREIGN EXCHANGE AND TRADING ACTUALLY WORKS.

OUR DATA HAS BEEN SORTED AND ORDERED USING A VARIETY OF SOFTWARE TOOLS, SUCH AS **MYSQL, C#, PYTHON AND EXCEL**. THE DATA IS GATHERED AT THE END OF TRADE AT **00:00** AND ALL THE INFORMATION FROM A CLIENT'S TRADE IS LOGGED, SUCH AS **NUMBER OF TRADES, SYMBOLS TRADED** AND **TP AND SL LIMITS.** A LARGE NUMBER OF TRADES OCCUR EACH DAY AND THE DATA-SET BECOMES INCREASINGLY LARGER, THUS THE NEED FOR THE DATABASE AND SQL LANGUAGES. A LOT OF **DATA CLEANSING** TOOK PLACE BEFORE WE PASSED THE DATA THROUGH PYTHON, REMOVING NULL VALUES AND ANY ABNORMALITIES SUCH AS DUPLICATES AND DATA WHICH ISN'T FEASIBLE. HAVING DONE THAT, WE COULD BEGIN PASSING IT INTO PROGRAMS SUCH AS TABLEAU AND PYTHON TO VISUALISE AND MANIPULATE THE DATA FURTHER.

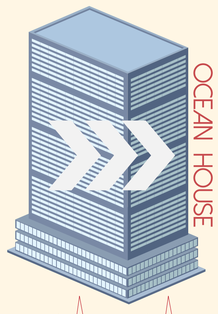
DO YOU REALISE?



ONE INTERESTING FEATURE OF OUR DATA WAS DUE TO THE NIGHTLY TIME-STAMPING. WHICH CAUSED US TO HAVE MULTIPLE TYPES OF PNL, I.E REALISED OR UNREALISED. AN **UNREALISED** TRADE IS ONE WHERE THE CLIENT HAS NOT CLOSED HIS POSITION YET AND HASN'T OFFICIALLY 'CASHED OUT' AND VICE VERSA WITH **REALISED** PNL. THIS IS SHOWN IN THE GRAPHS TO THE LEFT, WHERE A GREEN MARKER IS INDICATING THE **OPENING** OF A TRADE AND A RED MARKER INDICATES THE **CLOSING** OF A TRADE THE DATA-SETS WE MOSTLY USED WAS `ALLMINSINTRADE', WHICH IS CALCULATED BY SUMMING ALL THE 'OPEN', 'CLOSED', 'FLOATING AND 'LOCKED IN' MINNUTES AND AVERAGING IT PER DAY.

RESEARCH METHOD

THE MOST FREQUENTLY TRADED FOREX PAIRS ARE **EUR/USD**, **GBP/JPY** AND **XAU/USD**. WE USED THESE FOR OUR RESEARCH. AFTER HAVING NARROWED DOWN THE NUMBER OF SYMBOLS TO INVESTIGATE, WE DECIDED A GOOD ROUTE TO ASSESS THE RISKINESS OF A CLIENT WAS TO CREATE AN **AUTOMATED RANKING SYSTEM** BASED ON THEIR PREVIOUS BEHAVIOUR. WE CHOSE SOME KEY FACTORS WHICH WE BELIEVED WOULD BE THE MOST SIGNIFICANT IN ANALYSING RISK. WE USED PYTHON TO CREATE A RELATIVE RISK INDEX (**RRI**).



THE MAIN FEATURES OF RISK WE CHOSE WERE:
-AVERAGE **DISTANCE** OF CLIENT FROM FX PAIR THEY ARE TRADING.
-**NUMBER OF SYMBOLS** TRADED BY CLIENT.
-RATIO OF THE LIMITS AND **SPREAD** OF TAKE-PROFIT AND STOP-LOSS.
-**TIME** SPENT IN TRADE (MINUTES).
-**VOLATILITY** OF THE MARKET AT TIME OF TRADE.

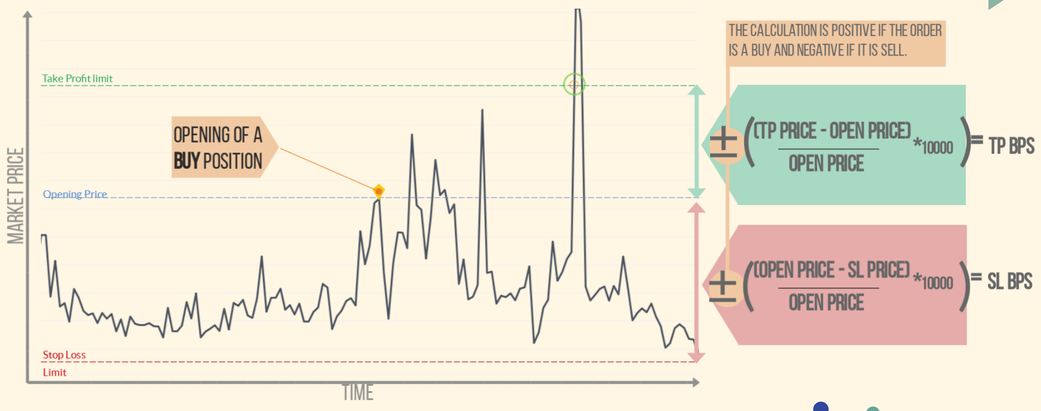
FINAL OUTCOME

ALL OF THE DATA FOR THIS STUDY IS GIVEN IN THE ACCOMPANYING POSTER. ALTHOUGH OUR STUDY AIMED TO BE AS ACCURATE AND UNBIASED AS POSSIBLE WHILST ANALYSING THE DATA, THERE ARE STILL IMPROVEMENTS WHICH COULD BE MADE. THERE WERE CONSIDERABLY MORE MALE CLIENTS IN THE GIVEN DATABASE THAN FEMALE CLIENTS, WHICH MAY MEAN THAT IN GENERAL, THE BEHAVIOUR OF FEMALE CLIENTS WAS NOT STUDIED TO THE FULLEST EXTENT POSSIBLE. TO TRY AND IMPROVE THIS, LARGER AMOUNTS OF DATA WOULD NEED TO BE COLLECTED, PERHAPS FROM A VARIETY OF COMPANIES AND OVER A GREATER PERIOD OF TIME, IN ORDER TO ACHIEVE MORE OF AN EVEN SPLIT BETWEEN GENDERS.

PROJECT EVOLUTION

THROUGHOUT THE DURATION OF THE PROJECT, IT SLOWLY BECAME AN INVESTIGATION INTO THE IMPACT AND **DIFFERENCES IN GENDER** WITHIN THE CLIENTS WHO WERE TRADING. WE INITIALLY SAW SOME VERY CLEAR INCONSISTENCIES, PARTICULARLY IN THE **SPREAD OF LIMITS** WHICH THE CLIENTS WERE SETTING, HENCE CONTINUED TO EXPLORE THIS AVENUE FURTHER...

KNOW YOUR LIMITS ...



ORDER LIMITS
"A TRADE WILL END ONCE ITS **STOCK PRICE** MATCHES A **LIMIT PRICE**"

RISK
"THE POSSIBILITY OF **LOSING VALUE**, AND IN THE CASE OF OUR STUDY IT IS THE **CHANCE OF LOSS** ON A FOREIGN TRADE"

TO CONCLUDE, USING THE RRI THAT THIS STUDY CALCULATES, WE OBSERVED NO CORRELATION BETWEEN THE AMOUNT OF RISK A PERSON TAKES AND THE AMOUNT OF PROFIT THEY MAKE. THE PROFIT AND LOSS MIGHT BE MORE GREATLY AFFECTED BY EACH COMPONENT AS OPPOSED TO AN AGGREGATED SCORING SYSTEM LIKE THE RRI. MOREOVER, THROUGHOUT TIME, EACH FACTOR MAY ALSO HAVE A DIFFERENT EFFECT ON THE PROFIT AND LOSS, OR THERE MIGHT BE FACTORS WHICH THIS STUDY HAS NOT CONSIDERED. ALTHOUGH THE MALE CLIENTS TOOK MORE OF A RISK THAN THE FEMALE CLIENTS, IT WASN'T BY A LARGE OR SIGNIFICANT MARGIN, HENCE IT IS ALSO IMPOSSIBLE TO PREDICT WHICH GENDER WILL TAKE MORE OF A RISK OR MAKE BETTER TRADERS. THIS IS SURPRISING SINCE WE WERE EXPECTING THE FEMALE CLIENTS TO BE CONSIDERABLY LESS RISKY THAN THE MALE CLIENTS.

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