

Brain training

Peter Wiesing is founder and CEO of Global Arbitrage Group. He has a background in brain research, a track record in the successful application of machine learning to futures markets, and ambitions to get into hedge funds and HFT. Andy Webb went to meet him.

Andy Webb: *Let's start with your background. How did you get into this business?*

Peter Wiesing: I spent a lot of time in college studying. I have a diploma in theoretical physics, but then switched to theoretical neuroscience for my masters at the Salk Institute in La Jolla. It was basically brain research. I then did a Phd in the same subject at MIT in cooperation with a German university. From there, I went to business school and did a PhD in finance and capital markets. It was a lot of work, I can tell you!

Andy Webb: *Is there a strong relationship between the neuroscience and much of what you do now?*

Peter Wiesing: No. However, it is critical to hire people in the quant business who have applied maths, which gives you a lot of experience in applying statistical models – which you also get if you do neuroscience or theoretical physics. It is not important to study neuroscience in itself.

Andy Webb: *When did you found Global Arbitrage?*

Peter Wiesing: Right after the second PhD. The name comes from the first strategy we implemented and traded with our own money - a million Euros - at the

end of 2006. It was a stat arb strategy. We developed models for pricing options, especially equity index options, and traded them on all global markets on an intraday basis in a quiet, quick way.

We are happy with the strategy so far. We benefited from the high volatility in 2008/2009 and markets remain volatile. However, I do not believe that our returns in a low volatility market such as 2004 would be as strong as they have been recently.

We did try to switch from a research and prop trading company into the hedge fund market in 2007, but it was a bad time. We had good numbers but all our seed investors withdrew. This is why we decided to concentrate on advisory work and risk management for institutional investors, mainly in Germany and the Netherlands. We have offices in both these places. We advise, not only in the fixed-income world, but the equity world too.

But we also have a few managed accounts from family and friends where we trade stat arb and overlay strategies, i.e. trading futures to hedge risks in a long only portfolio. Since the hedge fund industry shows stable growth again it is now time for us to get back into the hedge fund world, with a derivatives fund under the umbrella of a managed futures fund. We intend to start with a classical but very innovative managed-futures strategy, all proprietary.

Andy Webb: *With the managed accounts is that mostly options or have you introduced a trial for your managed futures idea?*



Peter Wiesing

Peter Wiesing: Family and friends are luckily very flexible clients. Starting in September we will shift some of the money to the managed futures base. We have already done tests on paper trading accounts on managed futures. Of course we have also done extensive back and other testing and other kinds of tests. Prop trading is the next step which will be followed by the launch of a UCITS III fund at the beginning of 2012.

Andy Webb: *With the managed futures strategy, is that a trend-following or reversal strategy? Or is it something else?*

Peter Wiesing: We see that the main drivers remain reversions and momentum in the futures markets. However, it is vital to have a very precise hypothesis and extensive experience in financial modelling to be able to identify and trade these inefficiencies.

We use our knowledge and experience to optimise and identify these patterns. We use higher statistics and advanced machine learning methods. We use published methods but have also developed methods ourselves. In comparison, simple approaches based for example on moving averages failed to predict trends and reversions or to generate alpha in recent years.

Andy Webb: *Are your machine-learning strategies and models based purely on the markets that you are trading or do they use multi-market analysis for individual markets? For example, if you are taking positions in Bund futures are you also analysing data feeds for multiple other instruments in the fixed income complex as well?*

Peter Wiesing: No, but the majority of the models we use are technical in nature, i.e. the input is price data only. We also do have other models for different markets, e.g. equity markets and fixed-income markets. Equity markets are very special because you have this correlation or anti-correlation ▶



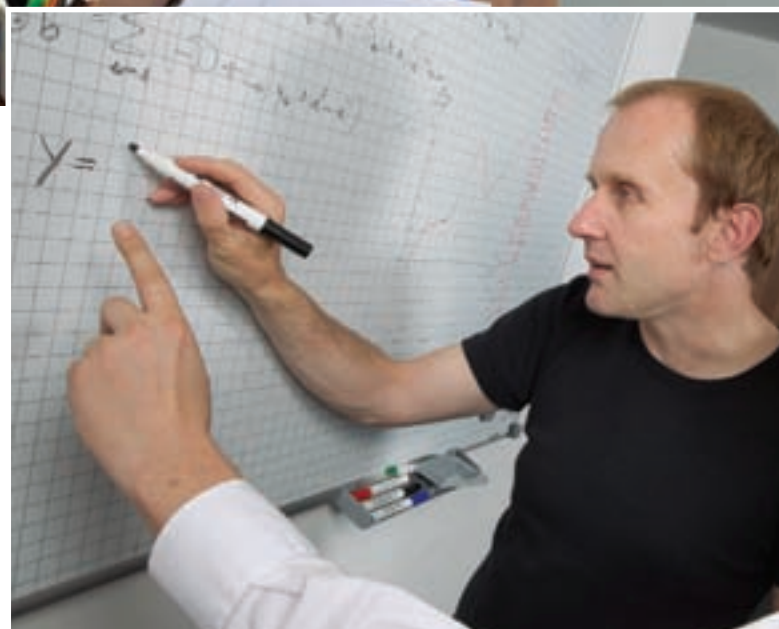
between volatility and future return. You can learn a lot from this volatility and you can use more sophisticated models to model it. You have a much better prediction for return patterns and especially for high returns. This is special and we don't see this kind of speciality in fixed income, commodity or FX markets. We see other special patterns in the fixed-income market using also historical forward rates and interest rate data.

We also have data available from monthly to intraday Level I tick data and see things on different timescales using the same methods. This puts us in a good situation because we can diversify across time scales as well as reducing the risk of over fitting.

Andy Webb: *So, effectively, you have diversification by market but you also have diversification by timeframe?*

Peter Wiesing: Exactly. Diversification is the key issue so far in my experience. That's easy to say because you read it everywhere – diversify, diversify – but I think that is the real beauty. This is because what we really see, in our trading and in our back testing, is that our models are valid for most of the time.

However, we also see that there are definitely times where the markets are not following their usual patterns. In the equity market there could be the impact of global economic factors, and of course these influence all other markets. In the commodity markets



there are also other factors. But these periods are limited to, say, a few weeks to a few months. These events that we might not be able to describe with our models - perhaps no one can really handle them.. That means, if you diversify and always come back to the diversification, then you lower your risk. If such an event happens in one market, you may be lucky in your other markets.

Andy Webb: *So you don't get hit everywhere at the same time. Are you trying to apply regime-switching models over and above this?*

Peter Wiesing: Yes, we use these in the equity markets. Regime-switching models are definitely an

ideal to strive for, but I don't know if you asked this question to find out whether we can identify regimes which are uncommon? That's pretty hard because with the rare events you don't have the patterns in the past that you need to make a prediction for the future.

Andy Webb: *Traditionally, people tend to simplify this and say - you have a momentum or trend regime and then you have a reversal regime where the market just chops sideways and there is no clear long-term trend. It's just going sideways. But in addition, I think you were talking earlier about a third category which is not exactly noise, but a non-predictable regime. Is that fair?*

Peter Wiesing: I'm not sure. We do use these regime-switching models, but I'm not sure if the models we use in the equity markets will fit this assumption of three categories. The basic thing is, if you use regime-switching models, first of all most of them are quite complex. That means by definition you need a lot of data to train these models. When you use these regime-switching models, I believe you should have – and this is what we use in the equity space - a maximum of two regimes. These could be, for example, a very high volatility versus low volatility regime. But it's quite hard to say that one regime is up-trending and one is down-trending. It's not that easy.

I'm not sure if it's possible to define these three regimes you mentioned and then apply regime-switching models to whatever market.

I think we tried this but weren't really successful. That doesn't prove it doesn't work but at least in our experience it is quite hard with regime-switching models because they are prone to over fitting.

Andy Webb: *And you have the further complication that I think a lot of fund managers have fallen down over, which is that the regimes that you are experiencing in one time-frame may not simultaneously apply in other time frames. You could say a momentum regime now applies to my daily time frame but you can see a totally different picture with one hour bars, five-minute bars and ticks. I take the point. Let's move on to technology. What are you using for your initial quantitative modelling for prototype testing? Are you using things like MATLAB or R?*



Peter Wiesing: We use MATLAB, R and C++ to program, test, and run our software. For trading and market data we use a range of market-data providers and then we also use the broker APIs. At the moment we trade with Interactive Brokers and Goldman Sachs International in London. Interactive Brokers is not as well known as Goldman but they have been in the electronic trading space for a very long time.

Andy Webb: *In which particular areas are you using R toolboxes that are not available in MATLAB?*

Peter Wiesing: MATLAB is very rich and offers everything and in terms of visualisation it is much more powerful than R. R offers a lot of sophisticated toolboxes in the area of higher statistics and other kinds of financial modelling. We use toolboxes just to enhance our own programs in that toolboxes aren't the main part of our code. We mainly implement our proprietary trading modules using C++. It is very convenient to build C++ code into MATLAB; it gives us better speed and performance. We use MEX files ▶

and we use MATLAB for visualisation because most of the final code is in C++.

Andy Webb: *I'm intrigued with this. The routines that you are writing in C++ and compiling into MEX files must be quite complex. Five years ago the difference between a MEX file and running it in native MATLAB code was significant; even for quite trivial things it was much faster using a MEX file. But since the introduction of the MATLAB just in time accelerator (which seems to have been gradually enhanced over the past few years) it seems that the difference in speed between the two has dwindled.*

Peter Wiesing: You might be right about that. For us, it's not a big difference. C++ is definitely the fastest so we test everything with MATLAB or R and when we are convinced, we write it down in C++ and it isn't a big deal. You might be right though, that is a good point.

Andy Webb: *Now, I wanted to ask you about Interactive Brokers. Are you using their FIX API?*

Peter Wiesing: Yes, though we also use the normal IB API, because you cannot get certain account info from the FIX API and it is also easier to get certain historical data from the standard IB API.

Andy Webb: *Who else is involved in the company?*

Peter Wiesing: We are still a small team totalling ten personnel, including administration. We have four people in the IT, software development and research area. They have two PhDs between them, one in machine learning and one

in computer science. They are running everything and doing the research. When the fund is launched, we want to invest more in this area because we think this is the key to a superior fund in the long run. We also employ a former head of trading from a major bank which enriches the team experience from the traditional trader's perspective.

Andy Webb: *One of the things that intrigued me from the original interview with my colleague in Automated Trader's Q1 and Q2 Buyside Beat features was that you seemed to have decided that very high frequency trading wasn't the area you wanted to play in. Is this right?*

Peter Wiesing: No - we are definitely interested in high frequency trading. The HFT space is driven by technology and you need a very fast and robust model, but not necessarily a sophisticated model. It is a competition of technology. Of course, everything we do is automated and technology-driven, but in comparison to a HF fund or prop trading firm we don't have anything comparable.

I can appreciate that especially in the last decade, people in the HFT space have made a lot of money. But I think it is getting more and more competitive and difficult because the speed of light is the end point. Additionally, the

increasing regulatory framework for exchanges, prop trading companies and others makes it extremely difficult to maintain these returns.





My hunch is that HFT firms can only make these high returns by manipulating their markets. What they do is trick the market by providing a lot of liquidity and making the market move in one direction very quickly. That's not fair value because they create some high intraday volatility on a millisecond basis which doesn't exist. But I think we are a long way from regulatory frameworks that can deal with market manipulation in a millisecond timeframe, so I think the HF playground will be around for a while yet.

If we are successful in the hedge-fund space, in three or five years I would definitely invest and see if we could do something in the high frequency space. We are a long way away from this right now - you can't do everything at once.

Andy Webb: *It always amuses us at Automated Trader that everyone is getting very excited about high frequency traders manipulating the market. We're obviously not condoning it, but let's face it twenty years ago all the traders in the pits used to manipulate the markets the whole time. They would all group together to bid the market up or down and run stops. Then when electronic trading came, we saw "1 2 3 Go Trading" where you*

would get a bunch of electronic traders all on the phone to each other at the same time and they would do the same thing electronically as they did in the pit. They would say "1,2,3 Go!" together and all click their mice at the same time to bid the market up or down.

Peter Wiesing: It still remains illegal, but you nevertheless see it on all timescales. In the end it is an exchange, so market participants meet and try to get the best price for themselves - that's just part of the game.

Andy Webb: *You mentioned database systems. What are you using?*

Peter Wiesing: MySQL.

Andy Webb: *Historical data providers?*

Peter Wiesing: We have data from all kinds of markets on all timescales. Since our launch we have been trying to treat all the markets we trade in a one minute timeframe. So we have a lot of data for this already. There is a company we have a lot of option data from called Tenfore that is particularly good in the equity index options space and can provide Level I data for this. We use Bloomberg subscriptions; we also have Reuters tick history, which is expensive, but excellent for intra-day trading. Interactive Brokers provide a little bit of historical data. I think that's basically it.

Andy Webb: *With real time data, with the models that you are currently running live, are you purely using the data coming down to you from Interactive Brokers to feed the models to generate the signals or are you using external data feeds?*

Peter Wiesing: We use mainly Interactive Brokers for that.

Andy Webb: *How does your advisory and overlay business fit into all of this? What kind of strategies are you providing to your clients and how are they delivered? Also, how might they link into the other things you do?*

Peter Wiesing: The advisory business is classic advisory work. We advise long-only portfolio managers on how to overlay their portfolios with a futures position. Our clients are institutional investors, pension funds and larger banks. They send us basic information on their portfolios and we send them an idea of how they have to structure their futures position. We don't trade for them and we run only a theoretical portfolio for them. ▶



We send them a monthly view of the markets, to include equity markets, mostly European, and the fixed-income markets, mostly the Bund future. We recently added an overlay for the Goldman Sachs Commodity Index. That would be for clients who have a long only commodity portfolio.

The FX part is missing here. We do want to extend into FX because we are going to launch a managed futures fund and there we also have models and market views for the common currency markets. That is in preparation for the advisory service. On top of this, we have GTAA, Quantitative Bond Management, and then portfolio insurance, absolute return and risk management which are all related areas. GTAA is basically an overlay for equity markets.

As regards portfolio insurance and risk management, we believe we can offer clients more precise methods in terms of risk values and how to hedge, structure or reduce their position if they want to have a certain limit. They may have a certain risk objective they don't want to hit, for example, and we advise them on how to achieve that.

Andy Webb: *Are most of these clients bond funds or are there equity funds amongst them?*

Peter Wiesing: It's mostly fixed income. It is a little bit tricky to answer this because bond managers are almost always bigger than equity managers. In terms of number of clients there is only a slight bias towards fixed income funds but in terms of AUM then it's of course fixed income.

Andy Webb: *You said there is no currency overlay earlier. It's purely risk overlay?*

Peter Wiesing: Yes it is a risk overlay and it's not for speculation. It means with this position you can regulate the beta from 0 to 100%.

Andy Webb: *The end result is that your client ends up with a better risk-adjusted return as a result of using your service?*

Peter Wiesing: Exactly! In theory we provide an overlay where you can regulate your beta from 0 to 100%, but in practice that is not the case. They might do it from 100% to 80%, for example, so the overlay is not dominating the provider of potential alpha.

Andy Webb: *How do you deliver this? Do you just send them a written report each month or are you streaming them this stuff in a live data feed?*



Peter Wiesing: It's a once a month report which fits the needs of our clients. They are trading every day, of course, but most of their decisions are made in monthly board meetings. Big decisions are always medium-term – far away from high frequency.

Andy Webb: You mentioned the Bund. You are presumably applying similar quantitative modelling, at a much slower time frame, to this as you do with your prop trading?

Peter Wiesing: Absolutely.

Andy Webb: You are endeavouring to project the long term performance of the Bund future?

Peter Wiesing: It is long term in terms of a trend. We try to identify a 4 to 12 week trend in the Bund futures market. It is technically driven. The standard model you have is that you are doing principal component analysis on interest rate curves, which you can combine with your own price data or the contract expiry effects you have in these markets. Our strength is to bring these effects together and provide the best possible analysis with our proprietary methods, including machine learning.

Andy Webb: With the fixed income investors you are advising, if you are mostly predicting the future performance of the Bund, is it right to assume that they are mainly holding German Government Bond securities?

Peter Wiesing: Yes and no. Our clients normally have all kinds of European bonds. But the change in the price of European bonds is 80% driven by the Bund future. For more local characteristics they may use other service providers.

Andy Webb: We've seen quite a divergence amongst the countries in Europe. When the Euro came in, things like the BTP future on the Italian bond disappeared. Now it is back because the divergence in credit ratings means that it's needed again. They may all be Euro denominated but they are futures based on different deliverables. How does this affect your analysis?

Peter Wiesing: That's not our business. We have clients who have a European bond portfolio rather than just German bonds. How they do it and which kind of analysis they use to come to their final results are not transparent to us.

Andy Webb: With the clients on the advisory side, would you say some of them include very large long only funds or are they mostly mid-sized?

Peter Wiesing: We have a few large ones in the Netherlands. In Germany, the funds are insurance funds and they are relatively large in the domestic market there.

Andy Webb: Do you find that some of the research that you do as part of the overlay business has particular value for what you are doing in other areas?

Peter Wiesing: Yes, that's right. For our stat arb option strategies, for example, we also need a view on the equity market. In total, the basis for all our activities - from the overlay business, to the stat arb strategies, to our managed futures strategies - can be summarised by research in the areas of markets models, risk models and portfolio construction approaches.

Andy Webb: Peter, thank you very much.

