**How do you handle rollover adjustments in alogs backtesting?**

Can anyone tell me how the modern tools manage the rollover adjustments (from one contract to another when the former reaches the expiry date) during backtesting? Suppose you have a strategy that you want to backtest over last 10 years. Now, there are numerous contracts of the same underlying that passed by over these 10 years. How do you tell your tool how to rollover from one to another over the backtesting time period?

[**Anthony Garner**](http://www.linkedin.com/groups?viewMemberFeed=&gid=62719&memberID=13338029) • Wow, that's some question. Begin by looking at[http://www.csidata.com/custserv/onlinehelp/OnlineManual/](http://www.linkedin.com/redirect?url=http%3A%2F%2Fwww%2Ecsidata%2Ecom%2Fcustserv%2Fonlinehelp%2FOnlineManual%2F&urlhash=HzYr&_t=tracking_disc)

Once there, look up the following: Computed Contracts:   
Their Meaning, Purpose and Application   
An Essay by Bob Pelletier

[**Brett R. Schlapfer**](http://www.linkedin.com/groups?viewMemberFeed=&gid=62719&memberID=1472330) • We had to build everything from scratch. We have 48 years of consensus data. The process of getting the data scrubbed and into a structure was 2 years of work. We also bring in daily exchange data O,H,L,C,V,OI.  
  
Other issue's you will need to deal with Holidays, changes in contract specs over the years and exchange product's Added/Deleted

[**Anthony Garner**](http://www.linkedin.com/groups?viewMemberFeed=&gid=62719&memberID=13338029) • Frankly, you have to build everything from scratch if you want to retain your sanity. Or learn about concatenated contracts and then keep them manually. The difficulty I have found during actual trading is that as data providers make changes and amendments to data, the historic time series can change and you find positions appearing and disappearing in your daily signal runs.  
  
But if you are still at the stage where you need to discover how to string futures contracts together, then unless you have considerable time or a decent sized organisation behind you you are better off using something like CSI while you learn.

[**Nikitas Goumatianos**](http://www.linkedin.com/groups?viewMemberFeed=&gid=62719&memberID=105147171) • Alternatively, (the easiest way) you can build your own data – one file – by gathering data from each contract of the same asset (when former reaches its expiry date or earlier add the next contract data). Some brokers provide such type of data. Otherwise, backtesting is more complicated (you have to programmatically develop such strategies)

[**Mark Brown mark@markbrown.com**](http://www.linkedin.com/groups?viewMemberFeed=&gid=62719&memberID=56072165) • i use perpetual data adjustments that gradually roll the calculations of the new contract to diminish the influence of the old contract as the new contract matures. ~m

[**Anthony Garner**](http://www.linkedin.com/groups?viewMemberFeed=&gid=62719&memberID=13338029) • Rolling at or near the expiry date is not a great idea for many contracts with physical delivery, especially if you need to avoid the first notice date. Most speculative traders need to roll before liquidity dries up in an expiring contract unless it is a contract with cash settlement. Particularly in the Japanese markets, liquidity passes to newer contracts many months before expiry of the old contracts. Perpetual contracts may be handy for back testing but may make many aspects of actual day to day trading rather complex since the prices shown are averages of old and new contracts and not actual prices of the current contract.. Many traders pick fixed dates on which to roll so that they can mark such dates in the diary and not miss a roll by mistake; some roll on open interest changing from the old to new contract, some on volume, some on a mixture. Pelletier's essay covers all these options.   
  
In any event, the matter is far more complex than can be dealt with on a simple thread and needs studying.   
  
Software to generate concatenated contracts is the main problem and hand rolling is not an option unless you trade very few markets indeed.   
  
In order to really understand the problems involved, start with Excel and experiment with a few different hand generated roll methods and a few different markets to to get some understanding of the complexities involved. And to learn what calculations and indicators you can safely apply to back adjusted contracts and which you can not.   
  
It is a huge topic and one of the most fundamental and basic necessities to fully understand before back testing or trading futures. It is not a simple subject to be conquered in a few hours. To put it mildly.

[**Mark Brown mark@markbrown.com**](http://www.linkedin.com/groups?viewMemberFeed=&gid=62719&memberID=56072165) • Perpetual Contracts - When a future contract nears expiration it becomes more volatile. That volatility causes many systems to initiate trades that would have otherwise not been engaged.   
  
If the real market is to be traded, surely then it would exist somewhere in between the current contract and next one out. Given that, I would suggest you think about this: Many people build models using back adjusted contracts and many other methods.   
  
All of my current EOD models work best on that type of data. However when you understand why they work better then you may want to reexamine the way you build models. You may have a model that follows price action anomalies.   
  
I propose that a good model instead trades a markets historical 70 to 90 percentile personality. The very moves that others concentrate so hard on, are the very moves I dismiss as an anomaly. 

[**Anthony Garner**](http://www.linkedin.com/groups?viewMemberFeed=&gid=62719&memberID=13338029) • I tell you one thing Mark, I have become extremely skeptical over the years; my only grumble with perpetual contracts is simply that I like to see actual prices on my charts for the latest contract, no other reason. Dean Hoffman pointed out a while ago a few interesting facts about the performance of the longest running CTAs and the recent collapse in many a track record has reinforced what he said. In the wide sample he looked at the average MAR ratio was around 0.4 and he was going to come up with some figures which included CTAs and programs which had crashed and burnt and were no longer to be found in most of the records.  
  
I have made every mistake in the book over the last decade or so and have reached the stage where I believe that in trading, as in every other area of life, there is a high degree of random luck and chance involved. I wish I could claim a smooth 45 degree upwardly sloping equity curve over the years but I can't. The history of the industry is littered with brave words of managers new and old who reckon their method(s) are the best and yet they still suffer (if not today then tomorrow) severe draw downs and uncomfortable volatility. If you are trading the right systems at the right times you will prosper and look like a hero, if you aren’t you won’t. I am not saying that there is no skill involved, far from it. I am saying that no matter how skilful one is and however long one has been trading, the banana skins remain strewn all over the path.  
  
The only point I am really trying to make to Dhrubajyoti is that if he is at the stage he must ask a question like that he asks here, then he needs to take a step back and prepare himself for a great deal of reading, testing and studying. He is still unlikely to fare better than any of the rest of us but at least he won’t be lost at sea without a compass. I have fooled myself so often over the years with back testing and the erroneous beliefs it engenders and I would not dream of saying right or wrong to anything or any method. I am only saying to Dhrubajyoti that he should know what he is getting himself into because the waters are very deep.

[**Mark Brown mark@markbrown.com**](http://www.linkedin.com/groups?viewMemberFeed=&gid=62719&memberID=56072165) • Anthony = i hear you but know this just because cave man didn't go to the moon doesn't mean that it can't be done. there is nothing random about the markets they are driven by the lust for the unearned - greed. this will never change as man will not change. i have been a back seat driver for many successful and unsuccessful trading companies. you are tainted goods a cave man who has been burnt by fire and can see no possible future use for it. others will come behind you, embrace - harness the fire and create the bronze age. the endless sea of human emotions and attitudes assures my success. now you can either hit the wall one more time or just give up and stay in a mundane existence. ~mark   
  
ps i am sincere if i can assist you in any way to rekindle your hope let me know. you will at least know that someone has crossed the river and is waving back accomplished.

[**Scott Boulette**](http://www.linkedin.com/groups?viewMemberFeed=&gid=62719&memberID=41267144) • I think my experience falls somewhere in between Anthony's and Mark's. On the one hand, like Anthony I feel as though I have made virtually every mistake possible and worse yet, a couple of them more than once. But like Mark, I also came through all that to see the other side.   
  
The reason I believe I am in the middle is that I have found major segments of algorithms that in my opinion, can only appear to work and it is as Anthony said, because you had the exact right algorithm operating under the exact right market conditions. If those market conditions could be predicted or even known midway through, that would be great but it seems in many cases it is only an after the fact observation.   
  
However, I also believe certain types of algorithms with good order management and proper asset allocation can and do work over the long term; getting all that in place seems to take years for most of us.   
  
But it can be done. There is an old song with a great line in it - if you don't give up and you don't give in, you may just be ok.

[**John W. Bennett**](http://www.linkedin.com/groups?viewMemberFeed=&gid=62719&memberID=9627297) • Great discussion. I agree with Anthony - what makes you great today may not in the future. Stay on top of your research.

[**Anthony Garner**](http://www.linkedin.com/groups?viewMemberFeed=&gid=62719&memberID=13338029) • My comments have been misconstrued, so I’ll set the record straight. I have lived very comfortably from trading alone since leaving investment banking in the early 90s and will continue so to do. But it has not been an easy ride: there have been very good years and very bad years and the only people who can achieve upwardly sloping 45 degree equity curves without retracement are probably relatives of dear old Bernie Madoff.   
  
My point is that in essence trading can be incredibly simple (particularly trend following) but (a) you have to put in a great deal of work to understand that and (b) once you have understood the basics you will realise that there is no “truth”, only degrees of it. You can make money from using perpetual contracts, back adjusted contracts and even concatenated raw futures contracts (although in the latter case, your back tests will be even more misleading than usual because of the effects of contango and backwardation).   
  
But you will suffer along the way from volatility, draw downs, good years, bad years, periods of doubt, periods of confidence. Back testing is a dangerous mirage in many respects but it is all we have got; as long as you don’t imagine you will achieve in practice that beautiful looking equity curve with a MAR of 2 as a long term trend follower. Long term, CTAs have achieved an MAR of around 0.4 on average if they have remained in the game long enough and the figures probably look worse if you add back in those track records of funds and CTAs which have bitten the dust. So, let’s put that in perspective: on average if you are aiming for a 15% CAGR net of fees you are likely to face a drawdown of around close to 40% at times. And a 20% CAGR suggests you may face 50% draw downs. If you think you can do better, great but many have tried before you and that is the average result. Yes, it is an average – some will do better, some worse.   
  
So a newcomer should work very hard to learn his trade but should look at the facts and not think he can achieve miracles (leave those to Bernie).

[**Mark Brown mark@markbrown.com**](http://www.linkedin.com/groups?viewMemberFeed=&gid=62719&memberID=56072165) • Anthony - i was going to write a big long response but deleted it because i disagree completely however respect your opinion. ~m

[**Anthony Garner**](http://www.linkedin.com/groups?viewMemberFeed=&gid=62719&memberID=13338029) • And I yours. If we all agreed on everything there would be no market!

[**Philip York**](http://www.linkedin.com/groups?viewMemberFeed=&gid=62719&memberID=94093897) • Gentlemen,  
  
Speaking as someone with a flat spot on my forehead from banging my head against the desk, I too have made my fair share of mistakes. I also find constant discomfort in the possibility of infinitely more, but the key I have found is how well we contain them – Antifragility as Nassim Taleb calls it. Ironically, Taleb the victim of a burning Black Swan prefers to teach others to embrace the burning Black Swans rather than embrace them himself anymore. I guess, despite being a weight-lifter his testosterone levels have waned. I suppose he is still making money from the markets, albeit indirectly!  
  
Setting the mixed metaphors aside, I must agree with Anthony if you’re going to handle it correctly rolling is one of the more complex issues in trading (along with stock adjustments). I remember back in the 80’s CSI used to have a rather clunky DOS program “quicktrieve” for pulling in preformatted file updates. This suited simple file types like individual contracts, spot continuation and Bob Pelletier’s beloved Perpetual Contracts, which I continually argued are almost useless, so in the early 90’s he put on a programmer to develop “Unfair Advantage” (UA).  
  
As UA was immensely buggy Bob wrote the original back-adjuster in Fortran… UA remained buggy until the original programmer was sacked. It’s now solid, the Fortran Back-Adjuster has been dropped and it offers more ways to concatenate files than anyone else, but sadly it only works with daily data as Bob has always considered short-term trading from intraday data a fools folly.  
  
Tick Data Inc on the other hand have always specialized in intraday data, although in the 80’s and much of the 90’s the greatest thrill was to delete the gappy, spikey crap from your hard drive. Thankfully Tick Data Inc was acquired by a Hedge-Fund manager to support their own historical data needs. The data and software has improved significantly since. TickData Inc’s program TickWrite offers the ability to concatenate intraday data, but sadly updates are only available daily.  
  
For real-time concatenated files eSignal offers quite a lot of flexibility as can be seen from the article below.   
[http://kb.esignal.com/article.aspx?article=4794&p=1](http://www.linkedin.com/redirect?url=http%3A%2F%2Fkb%2Eesignal%2Ecom%2Farticle%2Easpx%3Farticle%3D4794%26p%3D1&urlhash=GM2n&_t=tracking_disc)   
Sadly, many of the software programs that interface to eSignal do not support the complex symbol mapping depicted in the article. The other problem is actually tracking the roll-dates. With Unfair Advantage the active contract can be written out with the data.

[**Philip York**](http://www.linkedin.com/groups?viewMemberFeed=&gid=62719&memberID=94093897) • This leads us back to Anthony’s statement that you really need to build your own software, because still in this day and age there is NOTHING out there that enables you to adequately design, test and deploy algo to trade the futures or equity markets in a professional manner (Yes, I’m including, Apama, Deltix, Quant Developer and RTS Tango Quant in this list).   
  
In 1995 I developed my first fully automated trading environment. In 1996 I had this rewritten in C++ with it’s own inbuilt back-adjuster, despite the wonders of CSI’s UA – here’s why.   
  
Back in 1996 I had a few trading systems (now called Algos for some reason). For each of these Algos I had about 10 different parameter sets that I then applied across about 60 futures markets, making about 1,500 Market, System, Parameter combinations (MSP’s in my nomenclature). Overlaying this I had a Dynamic Asset Allocation Module (DAAM) that would evaluate the performance of each of the MSP’s and determine a proportional allocation to the ‘best’ MSP’s on a daily basis. It would do this in either simulated or live mode, the Live mode being differentiated by the orders being sent to a corporeal broker as opposed to a hypothetic (simulated) one.   
  
This was all bundled up in a proprietary package we called Market Explorer (ME). For the following years I averaged 20+%pa (after fees 4/20) with volatility at least as high due to my limited array of Algos and some limitations in DAAM and some issues relating to the maths of compounding returns in the real world (but that’s another story).   
  
Suffice to say I’ve come a long way since then, but my point is what I had to go through. To run a portfolio live, I needed to be able to test a portfolio in simulation and there is still virtually no software offering this innately. Trading Blox being a rather limited exception, NeoTicker is okay… and you can do it in Deltix and Quant-Developer if you write the MetaPortfolio infrastructure yourself (making it tough to justify $4+kpm). Try doing it in other packages and you’ll have a flat-spot on your forehead just like mine and begin to fantasize about the pink unicorn along coming to magically fix everything.   
  
As for trying to get any reasonable response from the software vendors, your face will turn from red, to purple and then toblue… Or as the Chinese say, “you’ll be coughing blood.” … except for maybe Anton Fokin’s Smart Quant, but Anton’s currently under-funded … So… yes… proprietary software is still the ONLY solution unless you’re happy paying $4-6k per month for something that only provides 15% of what you need. Personally, I find you can get a lot of programming done for $4-6kpm.   
  
When I talk about running a portfolio, I don’t mean just running a ‘Basket’ of Markets against an Algo-Parameter set as you can do in NinjaTrader or even something that runs volatility normalised position sizes against an aggregated portfolio return as in TradeStation or MultiCharts. I’m talking about something that monitors the performance of each MSP and dynamically adjusts allocations to each MSP within the portfolio. This requires full feedback.

[**Philip York**](http://www.linkedin.com/groups?viewMemberFeed=&gid=62719&memberID=94093897) • Each time period, you have to evaluate the simulated performance of all MSPs to calculate the portfolio metrics. Next you need to check your open positions to ascertain your available risk budget and construct a portfolio to place orders for the next time period. Then you trade for the next period, either hypothetically or Live.   
  
For the simulations to be accurate they need to trade on individual contracts as one does in Live trading. To do this the Algos need to call contiguous contracts for trading signals as even systems than trade 3-6 day time frames may use indicators with look-backs of hundreds of days.   
  
Let me start with the simple stuff first. Most of my algos were short term day-trading system with a few models stretching to 3 days. None of these Algos rolled positions. For these models I also only needed a few days data, so trading was fairly simple. ME would create the back-adjusted contracts on the fly and generate the trading signals which were then applied to the current contract. When the volume rolled from the current contract to the next contract out I would simply start placing in new orders in the next contract out.   
  
I tested all the various options in UA (after all, I helped Bob spec the program), and found that rolling on the First Trigger on Contract Volume alone was by far the best trigger for virtually every market (as long as the Volume didn’t glitch). This is similar to the “AutoRoll” method in TickWrite (from, TickData Inc), although TickWrite uses Tick Volume.   
  
The initial exceptions were a couple of the Stock indicies, the CAC40 and Australia SPI. More recently the S&P500 and Nat Gas others have become a pain as these markets give no volume based warning signal of roll. For these you just need to roll the requisite days before expiry.   
  
For the gap adjusting TickWrite offers Arithmetic (Difference) adjusting like UA, but only takes the difference between the Close of the Expiring Contract with Close of the New Contract and replaces it with the Close to Close gap of the New Contract. This however but screws up “Wilder’s TrueRange” calculations, so I had Bob put into UA the ability to take the Old Close to New Open gap and replace it with the gap from the Old or New contract (I use the later). I suppose I need to poke TickData about this sometime.   
  
TickWrite also offers the ability to do proportional (Ratio) adjustment which transforms all historical prices by an adjustment quotient. This to me is as useless as Perpetual Contract and something I will leave to the Economists and Statisticians (like Bob).   
  
Mark, I know you like “Perpetual Contracts” and I take your point on the volatility normalizing, but unless you remove the roll gaps out of the Perpetual Contract you’re bringing in a whole bundle of artificial (untradeable) movement back into the contract (although you may be removing the roll gap, I don’t know). Even then, the data is not reflective of the actual market you are trading, so what’s the use – unless you’re trading very, very, very long time-frame or doing some kind of Econometric model?   
  
For example, let’s say you’re trading Crude and there is a hurricane in the Gulf? Nearby go through the roof and the next out barely budges. The Perpetual gives no insight into the play – you want to short the nearby and buy the next out as Deliver Risk Premium is going to collapse. What about Cotton or Wheat… it starts raining… prices start to fall… then the nearby starts to rocket as the crop starts to rot, but the rain will be good for the next contract so it doesn’t rally much at all. What signal is the Perpetual Contract going to give you – not the right one if you ask me!   
  
But I’m still just scratching at the surface of the complexities.

[**Philip York**](http://www.linkedin.com/groups?viewMemberFeed=&gid=62719&memberID=94093897) • Consider an Algo using a 150 period Moving Average that averages 35% winning trades and 90 days per trade. The losing trades generally closed out in under a month (~20 trading days), but the winning trades tended to run for 4-6 months. Considering this do you really want to be placing orders for new positions in the current contract when the volume could roll any day? The answer is NO… You actually want to maintain your Open Positions in the current contract (e.g. a long) right up until roll date while you’re placing new orders (e.g. a short) in the next contract out (approx 20 days before roll date).   
  
What does this mean? It means that your environment (simulation and live) for a single Algo may need to run two back-adjusted contracts, one that rolls on the normal trigger (for the Open Position) and one that rolled the most recent contract early so you can generate signals for the New Orders on the next contract out. The environment will also need to track the two relevant individual contracts on which the orders are places.   
  
Also, the environment may need to generate orders for a roll for the Open Position to continue into the next contract out, but I have never heard of any third-party vendor contemplating such rolling capability. I suppose they consider the large traders who trade these time-frames have all written their own software – I did…   
  
Best wishes and good trading.

[**Scott Boulette**](http://www.linkedin.com/groups?viewMemberFeed=&gid=62719&memberID=41267144) • @Philip, thank you for this excellent collection of posts. One very simple take away for me - if I have to work to follow a post like yours (and I did), that is a good thing but the most important thing is -   
  
Don't try to compete with the person that has this level of understanding of an issue that is this complex; find your own niche unless you are also at that level.

[**Dhrubajyoti Nath**](http://www.linkedin.com/groups?viewMemberFeed=&gid=62719&memberID=33140194) • Wow! I could not follow my account for two days after I posted the question and now I am delighted to see such a great discussion that it triggerred. I am yet to catch up with all the views and opinions. I am developing a backtesting system where I am facing this challenge of making it easy to program the rollovers during backtesting. The more I think I understand more that I do not understand this. There may N number of ways it can be done and in a backtesting type scenario it is difficult to drive this like real life simulation. I need to understand how the advanced trading tools take care of the rollover "during backtesting" over a large timeframe. I actually have no clue.

[**Mark Brown mark@markbrown.com**](mailto:Mark%20Brown%20mark@markbrown.com) • here is a great aticle on adjusted contracts by a good freind of mine Thomas Stridsman - [http://pinnacledata.com/data/sys/ratio.pdf](http://www.linkedin.com/redirect?url=http%3A%2F%2Fpinnacledata%2Ecom%2Fdata%2Fsys%2Fratio%2Epdf&urlhash=qSHA&_t=tracking_disc)

[**Pablo Maglio**](http://www.linkedin.com/groups?viewMemberFeed=&gid=62719&memberID=159691963) • Most Platforms do the autorollover process so we just select the current instrument, the strategy parameters and date interval to analyze and the Platform will use the correct instrument for each day of the analysis.

[**Philip York**](http://www.linkedin.com/groups?viewMemberFeed=&gid=62719&memberID=94093897) • @ Scott, You can certainly avoid a lot of the roll-over issues as I mentioned if you are just day trading with Algos that only require a couple of days of data... of even just the current session.   
  
@ Pablo, Many of the platforms now support Merged contracts to some extent. Taking NinjaTrader as an example. You can set a Global (or local) policy to MergeBackAdjusted.   
  
This works two ways, local and vendor supplied. If you call up a Chart of ES 03-13 and request hundreds of days of history with the Merge Policy set to MergeBackAdjusted then you should get a few hundred days of back-adjusted data (Merged locally), however, this seldom works. If it does, then you can use an undocumented call to interrogate the current contract, but this will only tell you the new contract AFTER it has rolled.   
Instrument.MasterInstrument.RollOverCollection   
  
Alternatively, you can explicitly call a continuous contract with the ##-## delivery (e.g. ES ##-##). This requests a Merged file from the data-vendor, hence you are at the mercy of the data-vendor’s policies and the ability of NinjaTrader to make correct calls to the data-vendor.   
  
For example, for eSignal NinjaTrader only supports the most simple #F call to eSignal (see article 4794 from my previous posting). This means that NinjaTrader only supports Merged Contracts for a very small subset of the Instruments available with eSignal – hence they recommend Kinetick, which support no where near the number of instruments as eSignal, but at least you can get ##-## contracts for all the markets listed (although I’m suspicious of some of their adjustments).   
  
Once again, these feeds roll on Contract Volume, but provide you no indication of which contract their using when and no indication of an impending roll, so if you want to use them you’ll need to constantly check the current contract and the ##-## for a disparity between the two to indicate if there has been a roll. Then, if there has been a roll you will have to change the current contract (in your source unless you’re a C# wiz) AND reload the history for the ##-## contract (to apply the historical adjustment), then shut down and restart NinjaTrader, potentially screwing all your other positions… which leads you to your next challenge – resynchronising your orders and open positions between the Broker and NinjaTrader.   
  
So you might ask yourself, why on earth would you use NinjaTrader? The reason is because it is about the only retail package that provides reasonable support for resynchronising.   
  
Consider MultiCharts… You have various long term positions, your data-feed glitches and the Auto Trading switches off in every window. You can’t just go and (tediously) switch it back on in every window because now MultiCharts has no idea about any open positions. Because of this you are faced with either manually closing every position and having MultiCharts re-entering at market (crippling profits), or manually calculating your exit orders against open positions for an indefinite period, but this probably won’t work if you are trying to run a proper Real-Time Risk Budgeted Portfolio because you could lose track of your risk exposure.   
  
The wonders of electronic trading - enjoy!   
  
But for all the complexity I do not long for the days when I used to phone or fax through my orders.   
  
@ Mark, great article thanks. I also think I'll be revisiting my long-term models with gap adjusted Perpetual Contracts to see if there is a material advantage. Thanks.

[**Tom Gastaldi**](http://www.linkedin.com/groups?viewMemberFeed=&gid=62719&memberID=6734947) • >manage the rollover adjustments  
  
You should adjust the data to reflect the actual actions you would do in real trading. For instance, if you are "joining" 2 contracts near the expiry of the first one and you have a contango situation (which is pretty normal for instance for VIX futures), usually you need to adjust your scalp targets to take into account the price difference (for instance, my platform G-BOT does that automatically: adjusting the virtual scalpers the exact amount of the actual contango/backwardation). [If you do not adjust, for instance, in presence of large contango and a long position you may just accumulate losses.]  
  
In some situations, this can be equivalent, in backtesting, to process the tickdata and shift back the prices according to the various contango/backwardation amounts.  
A similar issue there is with splits.  
  
See for instance how this chart has been adjusted:  
  
[http://finance.yahoo.com/echarts?s=VXX#symbol=vxx;range=5y;compare=;indicator=split+dividend+it+ud+ke\_sd+volume;charttype=area;crosshair=on;ohlcvalues=0;logscale=off;source=undefined](http://www.linkedin.com/redirect?url=http%3A%2F%2Ffinance%2Eyahoo%2Ecom%2Fecharts%3Fs%3DVXX%23symbol%3Dvxx%3Brange%3D5y%3Bcompare%3D%3Bindicator%3Dsplit%2Bdividend%2Bit%2Bud%2Bke_sd%2Bvolume%3Bcharttype%3Darea%3Bcrosshair%3Don%3Bohlcvalues%3D0%3Blogscale%3Doff%3Bsource%3Dundefined&urlhash=anVb&_t=tracking_disc);  
  
(clearly the max price you see in the chart (1800) is the result of such process.   
vxx is trading at just about 28)

[**Patrick Rooney**](http://www.linkedin.com/groups?viewMemberFeed=&gid=62719&memberID=15027527) • There a several ways to go about this, one of the easiest is to backtest off a comparable spot instrument (cash FX for IMM futures) and weight your positions. You can weight your position by slowly rolling forward. For example if you carry a 10 lot position, roll one contract twenty days before expiration, roll another 19 days before expiration, etc, so you balance your exposure between front month and deferred contract. You could create your own continuous contract using a similar method or take the most deferred contract and factor out cost of carry.   
  
The rolling process could be based on a static number of days prior to expiration or use a weighted method to determine where the volume and OI is moving. For example, monitor the volume and OI in the first three contracts at all time. Average out the daily changes in volume and OI and as the market is moving forward, relate them, and move your positions forward on a relative basis.

[**Alexey Kryazhev, CFA**](http://www.linkedin.com/groups?viewMemberFeed=&gid=62719&memberID=5354049) • - For every future you trade, construct a single back-adjusted time-series first out of all individual historical contracts then feed these adjusted time-series to your algo's.   
- How you do it is really a part of your strategy. For example you could do a roll-over a certain number of days before expiry or based on relative trading volumes etc   
- You data provider may already have some tools on offer for creating back-adjusted series, but it really is not that complicated to write yourself.

[**Anthony Garner**](http://www.linkedin.com/groups?viewMemberFeed=&gid=62719&memberID=13338029) • Back testing off spot prices is extremely misleading because it fails to take account of market structure. The series you use for back testing will only approximate reality if you gap adjust at rollovers. The effect of contango and backwardation can be seen visually by comparing side by side a long term chart of the spot price against one with gap adjusting - they can often bear little relationship to one another. Take markets like wheat or gold and the effect is particularly noticeable. Many have said: test what you trade and trade what you test and I believe this to be good advice. You can not invest long term in spot cattle or wheat or indeed energies (unless in the latter case you have the storage facilities). Which is not to disagree with the idea of rolling by weighting on a continuous basis. Just to say do not back test with spot prices: the results will be complete nonsense in markets which gap between contracts.

[**Mark Brown mark@markbrown.com**](http://www.linkedin.com/groups?viewMemberFeed=&gid=62719&memberID=56072165) • anthony - interesting on the surface view, now let's foray outside the box a bit. all the problems you have outlined can be fixed with programming. typically my simple fix is to run the model on real time hourly perpetual blended data. my model never detects when it rolls from one contract to the next just as it would using cash.  
  
however the gentle ninety day roll period as such example sp index futures is seamless. i have done this for over twenty years and it works perfectly, real world trading of fund accounts. i did not discover this on my own i give the credit to ned davis research. it does require some thought and commitment to accept something no one else is doing and it is difficult to program such initially.  
  
~m  
  
ps stats - my trades last three to nine days typically at some point when liquid enough we roll into the next contract at the close of an old contract trade. the model has already adjusted itself on an hourly basis over the ninety day period. historical testing on spot shows virtually the same profitability and trades in the same position.  
  
how can this be possible? one missing detail, most all my models trade counter trend because i am institutional in trade size. i have no choice, i stand in front of the train to get positive slippage. i am not chasing price action i am defying it to stray from my statistical boundaries that have been revealed to me from one hundred million man hours or analysis.

[**Philip York**](http://www.linkedin.com/groups?viewMemberFeed=&gid=62719&memberID=94093897) • @ Mark, I see where you are coming from. Perpetual Contracts aren't the same as trading off the cash index or spot price and the financials aren't as prone to the large disparities between deliveries as commodities and the volatility smoothing can help smooth out spikes. Sounds like your models are robust enough to not really care either way though.   
  
Still, even if I'm using Perpetual Contracts, Spot Price or any such endogenous or exogenous data, I want to the signals for the sims running on actual individual contracts to minimize the tracking error between my sim and reality. Tracking Error is a killer for me because the simulation results drive my allocation, so if the simulation isn't realistic my allocation is skewed.   
  
For the same reason I always have a feedback loop on live slippage back into simulated slippage allowances. Where it gets tricky is the "unabled orders" on my trend following models ... that is, because I don't accept slippage most of the time my fill rate is only 95-97% on these models. Allowing for that in a sim is a little more tricky.   
  
P.S. Big fan of Ned Davis.

[**Mark Brown mark@markbrown.com**](http://www.linkedin.com/groups?viewMemberFeed=&gid=62719&memberID=56072165) • Phillip - yes very robust actually, and residual rollover spikes can actually help my positions as it gives me positive slippage just the opposite of what a trend trading method would experience.   
  
Ned Davis is a fantastic person and organization, I was trained off site and on-sight at their facility in Florida. I also operated one of the few licenses of their software for many years called Technalyzer. it's the software that you see whenever a chart of NDR's is published in the zillions of books and magazines on trading everywhere. ~m

[**Anthony Garner**](http://www.linkedin.com/groups?viewMemberFeed=&gid=62719&memberID=13338029) • Mark, I understand what you are saying of course and rolling on composite prices is also used elsewhere, particularly if you look at some of the index construction methods and commodity ETFs. The S&P 500 may not be the best example I imagine, since gapping is minimal compared to some of the commodities. I don't trade counter trend and my positions last months not days in markets as varied as Malaysian Rubber and Korean T Bonds rather than the highly liquid ES.  
  
At the date you roll, you suffer no spread (because you are on the right side of the spread) and presumably minimal commissions (given the size). Is there any difference whatsoever between the price of the old contract and the new at the time you typically roll? It seems you have no roll costs whatsoever? If can roll at absolutely no cost (or even at a profit) all power to your elbow; the majority can not because they trade in a very different way in some very different markets. There is currently a mere 0.5% spread in the CME quoted price on the ES (ignoring the complication of the bid offer spread) for March 13 and June 13 but of course hardly any trading in the latter. The spread between the two nearest cattle contracts is around 2.5%. Do you achieve zero roll costs in all markets and by using the same methods as you describe above is it therefore equally valid for you to back test and calculate your indicators on spot prices across the board?  
  
I think what you are saying is that gapping is not relevant to you or the way you trade? If you are long commodities you do not suffer contango and if your are short a contract which happens to be in backwardation, you do not have to pay a higher price on the roll?

[**Mark Brown mark@markbrown.com**](http://www.linkedin.com/groups?viewMemberFeed=&gid=62719&memberID=56072165) • anthony - i started out a s bond trader and back in those days starting out i experienced an occasional one tick penalty during a roll, this was the days of human brokers. thank the gods when electronic execution come along "and matured". change of contract is now of no significance at all, i am perhaps spoiled in fact i expect to at least break even or make a tick.   
  
i have no option to trade thin markets nowadays, i have traded everything every offered globally. right now i am trading in china on markets we have no access to outside china on software that is definitely not in english. it reminds me of the german markets twenty years ago the lack of any sophistication.   
  
i will try just about anything as long as i don't lose more than one mm a year experimenting. that is the key i think to vast market knowledge - knowing you will most likely lose that research investment each year and no pressure of doing so. this way you can listen to and follow what the computer modeling is telling you no matter how illogical you think it is. i have learned to accept i am a self acknowledged fool when compared to the algo's discovered. ~m

[**Anthony Garner**](http://www.linkedin.com/groups?viewMemberFeed=&gid=62719&memberID=13338029) • Understood but coming back to commodities if you are long commodities do you suffer contango?   
  
And if your are short a contract which happens to be in backwardation, you do have to pay a higher price on the roll?   
  
I imagine that Crude is liquid enough for you for instance?   
  
In the case of a long term trend follower, would your advice be that it is valid to back test using spot prices?

[**Mark Brown mark@markbrown.com**](http://www.linkedin.com/groups?viewMemberFeed=&gid=62719&memberID=56072165) • scenario is the price of our contract rising or falling compared to cash? typically in the contango mode we are selling into that and opposite on the backwardation we are buying into that. not always but that is the way it works out because as i have stated most people are buying into what the market actions are doing and we are always contrary to that.  
  
plus when you consider we are monitoring it on a hourly basis we have will take action and roll early to avoid any further cont. or back. loss differences. we can see this so clearly because one of the by products of creating an hourly synthetic perpetual contract is the visual spread.  
  
pictured below is a year bond model that thinks it is trading the current contract "red" yet what it is really trading is the perpetual contract created in real time hourly "white". you can see there is a small gradual spread between the two. the roll is as good as it gets. look at where the buy and sell arrows are at almost always at a convergence this is purposely modeled in.   
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[http://markbrown.com/linkedin/pics/2.png](http://www.linkedin.com/redirect?url=http%3A%2F%2Fmarkbrown%2Ecom%2Flinkedin%2Fpics%2F2%2Epng&urlhash=1D2N&_t=tracking_disc)

[**Anthony Garner**](http://www.linkedin.com/groups?viewMemberFeed=&gid=62719&memberID=13338029) • Mark  
Let us assume that Dhrubajyoti does not have the time or inclination to look at the markets throughout the day since he is working full time at another job. He wishes to follow the market action rather than go against it and intends to use end of day data to follow long term trends. He wishes to back test trend following strategies over 40 years of data. By definition he will sometimes be long contracts in contango and short contracts in backwardation. You may not agree with the way he trades and may believe that he is doomed to failure, nonetheless you want to answer his question as to how he should concatenate a long term price series for his own specific purposes.  
  
He has asked you: "should I use cash prices to back test my long term trend following strategies". How would you respond?

[**Dhrubajyoti Nath**](http://www.linkedin.com/groups?viewMemberFeed=&gid=62719&memberID=33140194) • Anthony, thanks for clarifying the question for me. At present this is exactly how I am testing my strategies i.e using cash prices. But this is turning out to be quite a compromise since this does not give a correct backtest result and not every strategy can be tested too.   
Secondly my backtest engine is to test full portfolio and my strategies involve multiple instruments - e.g. Cash (spot), Futures, Options (of same or different underlying instruments), commodities and currencies of different geographies having different market timing. This is very similar to Turtle strategies philosophy. While I can handle such strategies for backtesting over a month or two but if I try to backtest over 5 years - this becomes an impossible task.

[**Mark Brown mark@markbrown.com**](http://www.linkedin.com/groups?viewMemberFeed=&gid=62719&memberID=56072165) • @Anthony - He has asked you: "should I use cash prices to back test my long term trend following strategies". How would you respond?  
  
NO DON'T USE CASH -  
  
UNLESS YOU WERE ME OR YOUR ACTUALLY TRADING CASH. ~M  
  
ps i could work up some examples of how to accomplish this on a daily basis and we can see what i come up with, no promises but pretty sure it can be done. also note the the turtle systems would be the absolute most horrible system you could be using with cash by their nature they amplify the roll over magnitude.

[**Anthony Garner**](http://www.linkedin.com/groups?viewMemberFeed=&gid=62719&memberID=13338029) • You might also want to take a look at this:[http://tradersplace.net/index.php?do=/forum/thread/17/trading-system-development-process/view\_57//t\_1358259193/](http://www.linkedin.com/redirect?url=http%3A%2F%2Ftradersplace%2Enet%2Findex%2Ephp%3Fdo%3D%2Fforum%2Fthread%2F17%2Ftrading-system-development-process%2Fview_57%2F%2Ft_1358259193%2F&urlhash=jQWL&_t=tracking_disc)  
  
If you are interested in the Turtle process, you may be amused and impressed that random entries can achieve a profitable trading process!