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Test the arbitrage opportunity by using put-call parity model related to

Canadian index option.

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Abstract

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Submitted by Dawei Pan
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The main idea of this paper is to test whether there is arbitrage opportunity in Canadian index option market. This paper uses the put-call parity relationship to do the test. In order to make the test more logical, reasonable and close to reality, there are four assumptions made by this paper. The data, which this paper used, is also close to those assumptions. To test the existence of the arbitrage opportunity, 1266 pairs of data are used which include 633 long hedge positions and 633 short hedge positions. A T-test was used to test the existence of the arbitrage opportunities. The paper did the test separately for the long hedge position and short hedge position. The final conclusion of this paper is that, there are no significant arbitrage opportunities in the Canadian option market, but the arbitrage opportunities only really exist for very small probabilities.

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Chapter 1

Introduction

1. Purpose of study

The purpose of this paper is to find out whether there is arbitrage opportunity in the Canadian index option market. Arbitrage opportunity is always a hot topic in the financial world. Almost every investor prefers to earn profit under zero risk and cost. So it is very important to investigate the existence of any arbitrage opportunity. This paper will test the existence of the arbitrage opportunity by using the put-call parity relationship of options. If the put-call parity relationship is fails in the Canadian index option market, this means that index options in Canada have a mispriced problem. Then investors can build a portfolio by using put-call parity relationship base on these index options; this will help investors to earn profit without risk. Lots of research has been done with respect to the existence of arbitrage opportunity. In next chapter, some former literatures will be reviewed and discussed. These literatures are respect to the existence of the arbitrage opportunity and hypotheses of put-call parity relationship.

2. Background

The derivatives market is very important, not only for hedging or other investment purposes, but also for regulation purposes. Also, the options market has a huge effect

on the world financial market. The biggest options market is located in the United States.

CBOE (Chicago Board Options Exchange) has the biggest annual trading volume in the US and its trading volume moved above 1.2 billion at the end of 2011 in which index options occupy nearly 26.3%. CBOE is also the largest US options exchange: its trading volume of options is 25.2% among the total volume in the US. CBOE offers options related to over 2,200 companies and 22 stock indices.

The history of CBOE is like the history of the world options market. At the beginning, the OTC (over-the-counter) market was hard to bring the buyers and sellers together, but all the options were only traded through the OTC market before 1973. The creation of the CBOE solved this problem successfully; it made transactions more flexible and improved the development of the options market.

Because of the success of the option market, most of the world began to trade options. The history of the Canadian options market is very long and full of challenges. In 1874, after more than 40 years of irregular trading, the Montreal Exchange was established. Around 1975, the Montreal Exchange became the first exchange in Canada to offer stock options. In 1984, the Montreal Stock Exchange announced the first Canadian Market Portfolio Index; it was called XXM. Now the Montreal Exchange is a fully electronic exchange focused on the development of the Canadian

derivatives markets. It offers equity and index options, futures contracts, options on ETFs, currency options, index derivatives and interest rate derivatives.

The financial crisis, which started in 2007, led the Canadian options market into a deep recession, but the total trend grew steadily if looked at as a whole. The total volume grew 15% per year from 2002 to 2009 related in the research report of the National Bank in 2011. The total volume of trade in 2010 was 9.3million, and the ETF & index options occupied nearly 18%. The rest of the volume was occupied by stock options.

In modern financial description, the put-call parity model explains the relationship between the European call and put price based on the same underlying asset, strike price and day to maturity. In detail, it means the cost of buying a call option plus the present value of the strike price is equal to the cost of buying a put option plus the price of the underlying asset.

The put–call parity model needs minimal assumptions compared to other commonly used financial models, but investors must follow some assumptions when using this model. At first, neither the call nor put will be exercised before expiration date, so those options should be European style. Second, the underlying asset never pays any dividend or the options are dividend payout protected. For the dividend problem, this issue will be discussed by using other researchers' investigations in the next chapter.

Third, there's no transaction cost when the portfolio is conducted. Forth, it is assumed that the investor can borrow and lend the money by using the same risk-free rate. Lastly, it is assumed that all the market is efficient.

Related to the put-call parity relationship, an artificial call can be created by a long put, by buying an underlying asset and borrowing or creating an artificial put by a long call, selling an underlying asset and lending. So if the price of the real call (put) is different from the artificial call (put), then the real call or put is mispriced. So if this situation happened, an arbitrage opportunity will be shown for investors. If the call option is overpriced relative to the artificial call, then investors can create a portfolio by using put-call parity to generate a risk-free return. If a put is overpriced, the investors can generate risk-free return by using the same method. Can this arbitrage opportunity be realized in the Canadian index options market? This is what this paper will try to answer. In the next chapter some relevant research will be reviewed. It is important to give us some good ideas when studying put-call parity test.

3. Organization of study

This paper will be developed in five parts. The first chapter is the introduction and the second chapter is the review of literature. The third chapter will study the model and the analysis of results will be discussed in chapter four. The last part will be the conclusion.

Chapter 2

Literature Review

A lot of research has been conducted on the efficiency of financial markets around the world. Most of the research uses the arbitrage opportunity to test whether the market is efficient or not. If lot of arbitrage opportunities can be found in the market, the market is considered inefficient. Therefore, the put-call parity relationship can be used to test whether the arbitrage opportunity exists or not.

This literature review will discuss some the research related to the efficiency of the options market in North America, discussions about put-call parity's assumptions and some study about the put-call parity model.

1. Put-call model without dividend payment

Stoll (1969) is the first person that showed the put-call parity relationship that relies on the law of one price. His research was constructed by a put, call, and the underlying common stock; all of these three have interrelated relationship. Suppose any two of these three instruments can be combined to generate profit, and then the investor loses the opportunities of the third instrument. All the assumptions in his research are very simple: none of the put and the call in this relationship will be

exercised before maturity; there is no transaction cost between this relationship; the call and put option under this question are dividend payout protected and it probably means they do not have a dividend payment issue; investors can borrow and lend both at the risk-free rate. What Stoll indicated was the put-call parity relationship.

Stoll (1969) also did the test for the arbitrage opportunity in the US OTC options market. He used the put-call parity model and collected the data from 25 firms. At the end of his research, he ran an OLS (Ordinary Least Squares) regression to test the significance of the put-call parity. In the regression, relative call option price was treated as an independent variable; the risk-free rate and the relative put option price were regarded as dependent variables. If the put-call parity model rejects, it means there is arbitrage opportunity. At last, Stoll indicated that put-call parity can be used to test the arbitrage opportunities in the US option market. Stoll's model and his test progress are straightforward, and it is a simple tool for investors who want to find arbitrage opportunity in option markets. This paper benefits a lot from Stoll's research and its assumptions are similar to Stoll's. Stoll's testing method is also available in the paper.

In the Canadian option market, Eddy (1995) focused on whether there is arbitrage opportunity on the Canadian stock options market. Eddy's research was based on all the assumptions of the put-call parity model except for the style of the option. He assumed that neither the American nor European style of option will affect the result

of the study. By using put-call parity, 962 hedged positions were constructed. Among them, there are 454 long hedge and 508 short hedge positions. The result showed that there is no significant violation of put-call parity. Also Eddy concluded that time to maturity has no effect on the size of the violation and there was no arbitrage opportunity for the investors. There is some weakness in his paper. Eddy's data was not complete, so this caused his result to be not as reliable as others. However it is still a good test.

2. Existence of arbitrage opportunity

Ronn and Ronn (1989) used the box-spread strategy to test the existence of the arbitrage opportunity in US option markets. Box-spread is another strategy that can be used to find arbitrage opportunity. Their analysis about the length of time that the arbitrage opportunity exists leads to this paper's research on this topic. Ronn and Ronn used an ex post trading rule by applying a "recognition lag", including the time needed by the investors to get the data, the time to analyze the data and the time to finish their transactions. Ronn and Ronn divided the lag time into six different levels that related to different investors. These six different levels are from immediate to delays of 5 minutes, 10 minutes, 30 minutes, 1 hour and at the start of trading the next day. The result showed that the profit would decrease when the lag time increases. If the implementation is immediate, the investors can get highest return, which is nearly 38.3%. The return will drop to 11.2%, if the implementation finishes after 10 minutes.

The returns after 30 minutes and 1 hour are 13.8% and 9.7% respectively. The one-month risk-free rate was 12.7% at that time. So the result means that the mispricing will just exist for 10 minutes and after that, the market will adjust by itself.

Li and Alfay (2006) wrote a paper about the evidence of arbitrage opportunity in the Australian market. The paper focused on the arbitrage opportunity in the futures and futures option contracts that did transactions at SFE (Sydney Futures Exchange). The paper included calculation of the transaction costs that investors need to suffer, as well as discussion about the bid-ask spread like that mentioned above. The analysis of this paper included ex post and ex ante tests, and both these tests were used to study the arbitrage opportunity of the two derivatives markets in Australia. Firstly, an ex post analysis was carried out, and the result of it showed a significant number of violations of put-call parity relationship. Then, an ex ante result was shown by Li and Alfay, and the result is similar to the ex post one. This paper used the data on SPI 200 index future and option. SPI 200 Futures contract is a benchmark equity index futures contract from Australia. The paper also presented a detailed and accurate analysis of arbitrage opportunity. Future study revealed that the arbitrage profit will not be very significant, if the trading volume of the future and option contract is very small. Li and Alfay concluded that there's no strong evidence to prove the existence of the arbitrage opportunity between the SPI index future and future option markets in Australia.

Draper and Fund (2002) used the put-call relationship to test the arbitrage opportunity by using FTSE-100 index futures and options contracts. FTSE-100 is index of the stocks that those stocks are 100 companies listed on the London Stock Exchange with the highest market capitalization. The result of this paper is a little bit different from Li and Alfay (2006), but the method and idea are similar. The arbitrage methodology that they used in this paper avoided many problems about the option pricing and underlying asset. Both those problems have affected the former research for a long time. The way to cover this challenge was to match the option price within narrow time intervals with time-stamped transaction data. This also made the trading cost and market-impact cost more realistic. At the end of their research, they found that the arbitrage opportunities are limited and normally will disappear in less than 3 minutes. When the spread and volatility are greater and the time to maturity is longer, the profit becomes larger. However, the average ex ante profit is the same as the ex post profit in less than 3 minutes. Long option trades were more profitable compared to the short one, but the evidence of the existence of the arbitrage opportunity was still not very strong even for investors who can generate a small transaction cost.

3. Variables under put-call parity model

Phillips and Smith (1980) provided some ideas about the price to be used within the test. Before their research, other specialists used daily option closing prices in their data. Phillips and Smith showed that using the closing prices influences the result of

the test, and it will affect the chances that investors find abnormal returns. The main point is that they thought the closing prices are not accurate enough to present the prices at the given moment during the day. For example, the last trade for an option is in the morning, but another trade is at the close of the day; if we present both their prices by using the closing prices, it will be less accurate. Phillips and Smith called this non-contemporaneous data while others call it non-synchronous.

Phillips and Smith also responded to the previous research. They indicated the reason that the previous research in the options market found inefficiency was due to lack of considering trading cost. These costs include commission paid to brokers and the bid-ask spread. The former research proved that only the market makers and the traders can benefit from the commission paid. The cost of bid-ask spread was hard to calculate. The bid-ask spread is the difference between the highest quote to buy and the lowest offer to sell the option to the market. Phillips and Smith took the trading cost to the previous research, and the result was that the chance that arbitrage opportunity exists decreased and the excess return was eliminated. They also found that average prices of the option during the day also overstate the price because of the bid-ask spread. On the other hand, they still used average prices in their later research.

Frankfurter and Leung (1993) studied the existence of the borrowing and lending profit opportunities by using the put-call parity model of American options when dividends on stock are not expected. The only assumption that they used for the

put-call parity to hold is that option markets can generate efficient price of put and call options related to the underlying asset. The put-call parity relationship can be used to test whether the market is efficient or not. Frankfurter and Leung (1993) also restated another characteristic of put-call parity, which is "synthetic". This means all the instruments used for the combination of the portfolio that followed put-call parity relationships do not have too many restrictions. Investors can create their unique riskless return by lending with the parity or borrowing at their favorable rate. So it will give more choices for the investors to combine their own instruments at their convenience. In this situation, investors can test whether there are some opportunities that can help them to generate risk-less return or maybe "riskless rate" return. For example, if a portfolio related to the put-call parity relationship is created, it can be combined by long a call, short a put, long the stock and then borrow the money to make the cost equal to zero. The rate that investors use to borrow the money should not always relate to the T-bill rate; it may be higher than the T-bill rate or even lower than the T-bill rate. At the end, the result was not as optimistic as expected. The result showed that both synthetic lending and borrowing parities have negative expected profit. It seems that the rates used in put-call parity are inferior to the T-bill rate, but there is still some evidence about the existence of substantial profit opportunities. These opportunities are greater for some of the stocks than for others. They concluded the reason is because the pricing of the options is not always in sync.

4. Discussions about the assumption

Guo and Su (2006) published a paper named "Option Put-Call Parity Relations When the Underlying Security Pays Dividends" in the "International Journal of Business and Economics." In this paper Guo and Su considered the limitation of the put-call parity model. The basic model only holds under the hypothesis that the underlying asset does not pay dividends before the maturity date of the option. So in their paper, they relaxed this assumption, and tried to adjust the underlying asset's price by using the present value of the expected dividends. The new application for European options when the underlying asset pays dividends before options expire is as following:

$$S_0 - PV\,(Div) + Pe = PV(X) + Ce$$

The PV (Div) is the present value of the expected cash dividend payments generated by the underlying asset before the option's maturity date. The cash dividend will be discounted at the risk-free rate. For example: if the underlying asset expected to pay an amount of dividends at time t $(0 < t < T)$, then PV (Div) = Ae^{-rt}. The result of Guo and Su's research offered theoretical boundaries of the option prices and successfully expanded the basic model of the put-call parity. The new application is suitable for all options related to currencies, dividend-paying stocks and index options. It makes the put-call parity relation suitable for more kinds of option. This is very important for investors who prefer to focus on the options in which their underlying asset always generates cash dividends.

One of the assumptions that the put-call parity needs to follow is that the put and call option should all be European style. The details of the definition about the European option can be found in most of the textbooks, and it defines that the option only can be exercised at the maturity date. For an American option, it allows the owner to exercise at any time before the maturity date. So this means the owner has the right to choose a better moment to exercise the option in order to generate more profit. But in reality, the use of the American style option hardly impacts the return on the spread. The only difference for these two kinds of option is about the exercise date. The reason that the put-call parity model needs to follow this assumption is to reduce the effect of an option that is exercised early. Also this kind of effect is very difficult to compute. For example, in the simple model of put-call parity, if the call option is exercised early, the remaining portfolio will no longer be riskless. So in such a situation, the investor could exercise the remaining option immediately. But in real time, the probability that an American option is exercised early is less. Brennan and Schartz (1977) showed that the risk of early exercise for the American option was very low. There is just 1.8% of put exercised before the maturity date in their research. When the exercised date is closer to the maturity, the likelihood of mispricing the option would decrease. This means the risks of the spread reduce, and the American option's prices will be more accurate.

This chapter has reviewed papers related to put-call parity model and arbitrage opportunity. The next chapter will introduce the put-call parity and then indicate the

assumptions of this paper. In the later chapter, the data collection will be described.

Chapter 3

Methodology

The background of the put-call parity relationship and its basic logic has been explained in the first chapter. This paper will use real data to determine whether there are arbitrage opportunities in the Canadian index options market, and the result will be presented in next chapter. In order to help general readers understand how the put-call parity works and how can investors use put-call parity relationship to generate arbitrage opportunity, the paper will explain both these questions in a more detailed way. Also this chapter will conclude with an explanation of the data.

If the put-call parity model is violated, then there will be an arbitrage opportunity for the investors to earn risk-free profit. How could a failed put-call parity relationship cause an arbitrage opportunity? It is mainly because the put-call parity relationship is not at equilibrium. This paper will use a long hedge position and a short hedge position to explain the reason in detail.

We assume there is a portfolio A, it includes buying a put, buying an underlying asset, shorting a call and borrowing amount of money equal to the present value of exercise price (E) at risk-free rate. The structure of the portfolio A is called a long hedge position. Also the put and call option in this portfolio need to have the same exercise

price and date to maturity. The following table introduces the total cash flow:

Portfolio A	Current	At expiration	At expiration
		$St \leqq E$	$St > E$
Short a call:	C	0	$-(St-E)$
Long a put:	$-P$	$E-St$	0
Buy underlying asset:	$-S_0$	St	St
The amount of money that we need to borrow at rish-free rate:	$E*e^{\wedge}(-rt)$	$-E$	$-E$
Total cash flow:	$(C-P-S_0)+ E*e^{\wedge}(-rt)$	0	0

Related to the table above, no matter how the price of the underlying asset changes, the total cash flow at the maturity are all equal to 0. So, as long as the current cash flow is positive, the investors can earn profit without risk. If we use a equation to present, it will be like $(C-P-S_0)+E*e^{\wedge}(-rt) > 0$ or $C > P+ S_0- E*e^{\wedge}(-rt)$. Related to the equation $C > P+ S_0- E*e^{\wedge}(-rt)$, it seems the call price in this long hedge position is higher than the call price follow the put-call parity relationship. In other words the call option is overpriced relative to its theoretical put-call-parity value. So, if a call option can be identified as overpriced, then the investors can create a long hedge structure to generate risk-free return.

Let's consider there is also a portfolio B which includes short a call, long a put, long an underlying asset and investing amount of money equal to present value of exercise

price (E) at risk-free rate. This kind of structure is called short hedge position. Also the put and call option in this portfolio needs to have the same exercise price and date to maturity. The total cash flow of portfolio B will be as follows:

Portfolio B	Current	At expiration $St \leqq E$	At expiration $St > E$
Long a call:	-C	0	St-E
Short a put:	P	-(E- St)	0
Short underlying asset:	S_0	-St	-St
The amount of money that we used for investing:	$-E*e^{\wedge}(-rt)$	E	E
Total cash flow:	$P+S_0-E*e^{\wedge}(-rt)-C$	0	0

The result over here is similar to the Portfolio A. As long as the current cash flow is positive, there will be arbitrage opportunity for the investors. This means $P+S_0-E*e^{\wedge}(-rt)-C > 0$ or $P > C+ E*e^{\wedge}(-rt)-S_0$. These equations show that the put price in this short hedge position is higher than the put price following the put-call parity relationship. It also means the put option is overpriced relative to its theoretical put-call-parity value. So, if a put option can be identified as overpriced, then the investors can create a short hedge structure to generate risk-free return.

1. **Put-call parity when index pay dividends**

An index option is a kind of derivative that gives investors the right but not the

obligation to buy or sell a basket of stock. This mean, the index represents a basket of stock, so because of the dividend issue it will become very difficult for the investor to estimate the price of the index option. Investors will need to know all of the individual stocks' dividend payments and weight them in proportion to each stock's weighting in the index. Large investment banks or institutions will have a specialized department to handle this problem. Also we can use the dividend yield that is computed by a third party, like Bloomberg. Nearly all the index options have cash flow related to the dividend payment. So, we can not just use assumptions to ignore the dividend issue in this paper. What we can do is use the dividend yield collected by Bloomberg to identify the influence caused by dividend payments.

Within the literature review, I have already mentioned a paper written by Guo and Su (2006). In their paper, they demonstrate that if the underlying stock pays dividend before the maturity of the option, the put-call parity can be modified as:

$$S_0 - PV\ (Div) + Pe = PV(X) + Ce$$

But the specific amount of the dividend payment is not easy for us to compute or collect. So just like what we mentioned above, we can use the dividend yield collected by the third party to replace the specific amount of the dividend payment. That's because, it's easy for us to get the dividend yield and the result will be similar.

So the equation above can be changed into the following equation:

$$S_0 * e\textasciicircum(-yt) + P = E * e\textasciicircum(-rt) + C$$

Where yt is the dividend yield of the index and $S_0*e^{\wedge}(-yt)$ exclude the cash flow related to the dividend payment before the maturity of the option. In Guo and Su's equation, the part "S_0 – PV (Div)" also excludes the cash flow related to the dividend payment. So the object is nearly the same, and the difference is Guo and Su use specific amount of dividend payment, but for here we use the dividend yield collected from the third party. Proof of the above relationship can be found in most textbooks on options.

With all the above preparation, it is the right time to introduce the hypotheses, assumptions and sources of data.

2. Hypotheses:

This paper will use the following hypotheses to test statistical significance:

H_0: There is no opportunity for the investors to earn arbitrage profit.

H_1: There is opportunity for the investors to earn arbitrage profit.

The form of put-call parity relationship where underlying stocks pay dividends is just like what we mentioned before:

$S_0*e^{\wedge}(-yt) + P = E*e^{\wedge}(-rt) + C$

C: current call price

P: current put price

S_0: current underlying stock price

E: the exercise price

e: indicating continuously compounding

r: risk-free rate

t: date to maturity

yt: dividend yield

3. Sources of data

The main source of the data is collected from the website of Montreal Exchange-*www.me.org,* Bloomberg and Yahoo! Finance-*http://finance.yahoo.com/,* including the call price, put price, exercise price, date to maturity, dividend yield of the index and the price of the index. This paper uses the one month Treasury bill rate to represent the risk-free rate when each option was recorded. This one month Treasury bill rate is collected from the website of Bank of Canada-*http://www.bankofcanada.ca/.* There are 1266 pairs of put-call parity data form October 2011 to June 2012, inclusive. The nine-month-period index option data is collected from the 5 index options and these five index options have the top five highest trading volumes within Canadian index option market from the year 2010 to 2011. They are XIU (iShares S&P/TSX 60 Index Fund), XFN (iShares S&P/TSX Capped Financials Index Fund), XEG (iShares S&P/TSX Capped Energy Index Fund), XGD (iShares S&P/TSX Global Gold Index Fund) and GAS (iShares Natural Gas Commodity ETF). The detail introduction of these five index options will be included

in appendices A. Most of the index options in the market are hardly traded by the investors, so that is the main reason this paper searches for options that can generate a higher volume.

The biggest problem for data collecting is how to make the data to satisfy the assumptions that like what we mentioned above. The following discussions are related to the challenge in data collecting:

1. All the index options within my data are American options. So, it will become difficult for us to identify whether these option will be exercise before the maturity date. In order to reduce the possibility that the American option exercise before maturity, I reduce the time left to maturity to a small enough level. We can use this way to satisfy the assumption that none of option will be exercised before the maturity date. There is an example that can explain this method. If the time left to maturity is one trading day (the third Friday in one month, and the following Saturday is maturity date), then, the American option will be very close to European option. So, all the index options' length of time to maturity will be very short.

2. We use the close price for the stock price and ask price for option price, both short and long position is same. In this way, we can exclude the transaction cost.

Then, let's discuses the limitations among the data collecting:

1. We just mentioned that this paper will reduce the options' time left to maturity to

satisfy the assumption. In this way, the American option will close to European option, but there will be still problems for early exercise. So the first assumption will be violated in some degree.

2. Treasury bill rate is not the real risk-free rate due to Treasury bill's little default risk. However, Treasury bill is good enough to be a proxy for risk-free rate, related to the short time left to maturity the error will be very small.

3. The data of the security price in this paper is daily ending data. The real price within each trading day should be more dynamic.

Chapter 4

Analysis of Results

To test whether there is arbitrage opportunity in Canadian index option market, 1266 pairs of put-call parity data have been constructed. Among these 1266 pairs of data, 633 pairs are long hedge position and 633 pairs are short hedge position. In this chapter, in order to do the analysis in a more reliable way, we plan to divide the analysis into two different steps. Firstly, let's do the test of put-call parity using a total of 634 long hedge positions. Secondly, let's do the test of put-call parity using 634 short hedges positions.

The study analyzes the data form October 2011 to June 2012, inclusive. When we analyze the data, we use the formula mentioned before:

$$S_0 * e\wedge (-yt) + P = E * e\wedge (-rt) + C$$

The call price and put price(C and P) are used the last price. The risk-free rate r is the one-month Treasury bill rate of Canada in the issue day. The data of the one month Treasury bill rate will be shown in Appendix B. The time to maturity (t) is calculated as the actual day to maturity expressed as a fraction of one year. In order to follow the assumption that all the call options and put options are European style. So we just choose the option traded one day before the maturity date. This makes the American option very close to the European option, because we reduce the time before maturity

into a very small level. All these are shown in Appendix D.

1. The long hedge position test:

Within Appendix D, there are 633 pairs of data related to long hedge position. We compute the difference between the real call price and the relative theoretical call price. The equation is as follows:

$$C- [S_0*e\string^(-yt) + P- E*e\string^(-rt)]=\text{Difference } (d_c)$$

So related to the definition that we mentioned in the last chapter about how investors can generate arbitrage opportunity in long hedge position. If the difference is larger than zero, this means there is arbitrage opportunity for investors in the long hedge position. We also can use the following equation to explain:

$$C> S_0*e\string^(-yt) + P- E*e\string^(-rt)$$

The range of difference (d_c) is from -3.66232 to 3.734491 with a mean of 0.019136469. Most of the differences are very close to zero. Related to the figures above, we can not get an accurate result. So, let's use a T-test to find whether there are significant arbitrage opportunities related to long hedge position?

H_0: $\mu \leqq 0$, There is no significant opportunity for the investors to earn arbitrage profit by using put-call parity model in the Canadian index option market.

H_1: $\mu > 0$, There is significant opportunity for the investors to earn arbitrage profit by using put-call parity model in the Canadian index option market.

$$\overline{d}_c=1/n\sum di=0.019136469$$

$$S_d = \{\sum (di - \overline{d})^2 / (n\text{-}1)\}^{1/2}=0.754306934$$

$$t = \overline{d}* n^{-1/2}/ S_d = 0.63879033$$

The critical value at 95% level is 2, and the t value is significantly less than 2. We do not reject H_0. This mean there is no significant opportunity for the investors to earn arbitrage profit by using put-call parity model in Canadian index option market.

2. The short hedge position test:

There are 633 pairs of data related to the short hedge position. We compute the difference between the real put price and the relative theoretical put price. The equation of the short hedge position is as follows:

$$P - [E*e^{\wedge}(\text{-}rt) + C\text{-} S_0*e^{\wedge}(\text{-}yt)]=\text{difference } (d_p)$$

So if there is arbitrage opportunity for the investors, the real put price must be larger than the put-price related to the put-call parity model. This also means the difference (d_p) should be large than zero for investors to gain risk-free profit in the short hedge position. So we can arrange the equation into:

$$P> E*e^{\wedge}(\text{-}rt) + C\text{-} S_0*e^{\wedge}(\text{-}yt)$$

The range of difference (d_c) is from -3.436810463 to 3.853899493 with a mean of -0.019136469. Also most of their differences are very close to zero. It's really hard to find differences which are large than 0.5. Related to the figures above, we can not get an accurate result. So, let's also use a T-test to figure out whether there is significant

arbitrage opportunities related to short hedge position?

H_0: $\mu \leqq 0$, There is no significant opportunity for the investors to earn arbitrage profit by using put-call parity model in Canadian index option market.

H_1: $\mu > 0$, There is significant opportunity for the investors to earn arbitrage profit by using put-call parity model in the Canadian index option market.

$$\bar{d}_c = 1/n \sum di = -0.019136469$$

$$S_d = \{ \sum (di - \bar{d})^2 / (n-1) \}^{1/2} = 0.754306934$$

$$t = \bar{d} * n^{-1/2} / S_d = -0.63879033$$

The critical value at 95% level is two, and the t value is significantly larger than negative two. We do not reject H_0. This mean there is no significant opportunity for the investors to earn arbitrage profit by using put-call parity model in the Canadian index option market.

3. Implication of the result

The result we get from the calculation of the data source is objective, but it can not stand for everything. From the T-test we recognize that there is no significant opportunity for the investors to earn arbitrage profit by using put-call parity model in the Canadian index option market. Does this mean the put-call parity model works well in the Canadian index option market? I conclude the reasons into two main points. Firstly, the method we use here is put-call parity relationship. In order to make

this method work, some of the assumptions need to be followed. However, regard to the data selection, we make the American option close to European option, but there will be still some errors within data selection and calculation. Also we ignore the transaction cost, but it will not become true in real market. Secondly, the results of the T-test for both long and short hedge positions show that there are no significant arbitrage opportunities. However, there are still 272 pairs of data that their difference is large than zero. Although most of their differences are very close to zero, there are still a small parts of the differences are big enough to generate significant risk-free return.

Chapter 5

Conclusions

The main idea of this paper is to test whether there is arbitrage opportunity in Canadian index option market by using the put-call parity relationship. This paper uses the method of the put-call parity model to test the arbitrage opportunity. Because this paper is focuses on the index option, so we use the put-call parity model when the underlying stocks have dividend payments. To make the test more logical, reasonable and close to reality, there are four assumptions made by this paper. The data that this paper used is also close to those assumptions. To test the existence of the arbitrage opportunity, 1266 pairs of data have been used which include 633 long hedge positions and 633 short hedge positions. A T-test was used to test the existence of the arbitrage opportunities. The paper did the test separately for the long hedge position and short hedge position.

Given a 0.05 level of significance, in the long hedge positions test and short hedge positions test, there are no significant arbitrage opportunities for the investors. Also in the test of the individual index options, most of the same result as above. However, a just a few of them show a significant violations against put-call parity relationship, and this indicate the existence of the arbitrage opportunities but in a very small percentages. Even though we found the existence of the arbitrage opportunities, it still

can not lead to a conclusion that the put-call parity model does not hold in Canadian index option market.

For future study in this area may wish to use simultaneous pricing instead of the last price and to include the transaction cost and to consider other factors my influence the assumptions. The researcher can have a more realistic view of arbitrage opportunities in Canadian index option market by do this.

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Appendices

Appendix A: Introduction of the five index options used in this paper

XIU: iShares S&P/TSX 60 Index Fund is an exchange-traded fund incorporated in Canada. The Fund seeks to provide long-term capital growth.

XFN: iShares S&P/TSX Capped Financial Index Fund is an exchange-traded fund incorporated in Canada. The Fund seeks to provide long-term capital growth.

XEG: iShares S&P/TSX Capped Energy Index Fund is an exchange-traded fund incorporated in Canada. The Fund seeks to provide long-term capital growth.

XGD: iShares S&P/TSX Global Gold Index Fund is an exchange-traded fund incorporated in Canada. The Fund seeks to provide long-term capital growth.

GAS: iShares Natural Gas Commodity Index Fund is an exchange traded fund established in Canada. The Fund seeks to replicate the performance of the NGX Canadian Natural Gas Index. The Fund seeks to invest in physical forward contracts or derivative contracts to obtain exposure to the natural gas market.

Appendix B: 1-month Treasury Bills from Canada		
Daily series: 2011-10-03 - 2012-06-29		
Summary	Date	r
Low	2012/1/6	0.68
High	2012/4/24	0.99
Average	2011-10-03 - 2012-06-29	0.85
Date	r	
2012/6/29	0.86	
2012/6/28	0.88	
2012/6/27	0.88	
2012/6/26	0.86	
2012/6/25	0.86	
2012/6/22	0.86	
2012/6/21	0.87	
2012/6/20	0.87	
2012/6/19	0.87	
2012/6/18	0.87	
2012/6/15	0.87	
2012/6/14	0.89	
2012/6/13	0.89	
2012/6/12	0.87	
2012/6/11	0.88	
2012/6/8	0.88	
2012/6/7	0.89	
2012/6/6	0.89	
2012/6/5	0.87	
2012/6/4	0.87	
2012/6/1	0.89	
2012/5/31	0.91	
2012/5/30	0.9	
2012/5/29	0.91	
2012/5/28	0.91	
2012/5/25	0.88	
2012/5/24	0.88	
2012/5/23	0.89	
2012/5/22	0.88	
2012/5/21	Bank holiday	
2012/5/18	0.89	
2012/5/17	0.88	

2012/5/16	0.89	
2012/5/15	0.89	
2012/5/14	0.91	
2012/5/11	0.91	
2012/5/10	0.91	
2012/5/9	0.86	
2012/5/8	0.91	
2012/5/7	0.93	
2012/5/4	0.93	
2012/5/3	0.92	
2012/5/2	0.96	
2012/5/1	0.96	
2012/4/30	0.97	
2012/4/27	0.99	
2012/4/26	0.98	
2012/4/25	0.98	
2012/4/24	0.99	
2012/4/23	0.98	
2012/4/20	0.98	
2012/4/19	0.97	
2012/4/18	0.97	
2012/4/17	0.94	
2012/4/16	0.93	
2012/4/13	0.93	
2012/4/12	0.93	
2012/4/11	0.92	
2012/4/10	0.93	
2012/4/9	0.92	
2012/4/6	Bank holiday	
2012/4/5	0.92	
2012/4/4	0.93	
2012/4/3	0.92	
2012/4/2	0.92	
2012/3/30	0.91	
2012/3/29	0.9	
2012/3/28	0.89	
2012/3/27	0.88	
2012/3/26	0.9	
2012/3/23	0.88	
2012/3/22	0.88	
2012/3/21	0.88	
2012/3/20	0.87	

2012/3/19	0.85	
2012/3/16	0.87	
2012/3/15	0.87	
2012/3/14	0.82	
2012/3/13	0.83	
2012/3/12	0.85	
2012/3/9	0.85	
2012/3/8	0.84	
2012/3/7	0.85	
2012/3/6	0.87	
2012/3/5	0.85	
2012/3/2	0.87	
2012/3/1	0.89	
2012/2/29	0.88	
2012/2/28	0.86	
2012/2/27	0.87	
2012/2/24	0.87	
2012/2/23	0.88	
2012/2/22	0.88	
2012/2/21	0.88	
2012/2/20	Bank holiday	
2012/2/17	0.87	
2012/2/16	0.87	
2012/2/15	0.84	
2012/2/14	0.85	
2012/2/13	0.85	
2012/2/10	0.85	
2012/2/9	0.85	
2012/2/8	0.84	
2012/2/7	0.84	
2012/2/6	0.84	
2012/2/3	0.85	
2012/2/2	0.85	
2012/2/1	0.86	
2012/1/31	0.85	
2012/1/30	0.84	
2012/1/27	0.84	
2012/1/26	0.83	
2012/1/25	0.84	
2012/1/24	0.81	
2012/1/23	0.79	
2012/1/20	0.78	

2012/1/19	0.79	
2012/1/18	0.77	
2012/1/17	0.74	
2012/1/16	0.74	
2012/1/13	0.73	
2012/1/12	0.73	
2012/1/11	0.71	
2012/1/10	0.72	
2012/1/9	0.71	
2012/1/6	0.68	
2012/1/5	0.72	
2012/1/4	0.72	
2012/1/3	0.75	
2012/1/2	Bank holiday	
2011/12/30	0.73	
2011/12/29	0.74	
2011/12/28	0.76	
2011/12/27	Bank holiday	
2011/12/26	Bank holiday	
2011/12/23	0.77	
2011/12/22	0.77	
2011/12/21	0.74	
2011/12/20	0.74	
2011/12/19	0.75	
2011/12/16	0.77	
2011/12/15	0.77	
2011/12/14	0.78	
2011/12/13	0.73	
2011/12/12	0.74	
2011/12/9	0.74	
2011/12/8	0.75	
2011/12/7	0.76	
2011/12/6	0.76	
2011/12/5	0.78	
2011/12/2	0.79	
2011/12/1	0.8	
2011/11/30	0.8	
2011/11/29	0.8	
2011/11/28	0.81	
2011/11/25	0.82	
2011/11/24	0.81	
2011/11/23	0.81	

Date	Value	
2011/11/22	0.82	
2011/11/21	0.84	
2011/11/18	0.84	
2011/11/17	0.83	
2011/11/16	0.83	
2011/11/15	0.83	
2011/11/14	0.84	
2011/11/11	Bank holiday	
2011/11/10	0.84	
2011/11/9	0.83	
2011/11/8	0.85	
2011/11/7	0.85	
2011/11/4	0.85	
2011/11/3	0.85	
2011/11/2	0.84	
2011/11/1	0.85	
2011/10/31	0.84	
2011/10/28	0.85	
2011/10/27	0.85	
2011/10/26	0.85	
2011/10/25	0.84	
2011/10/24	0.86	
2011/10/21	0.86	
2011/10/20	0.84	
2011/10/19	0.84	
2011/10/18	0.83	
2011/10/17	0.84	
2011/10/14	0.84	
2011/10/13	0.84	
2011/10/12	0.8	
2011/10/11	0.83	
2011/10/10	Bank holiday	
2011/10/7	0.83	
2011/10/6	0.81	
2011/10/5	0.8	
2011/10/4	0.81	
2011/10/3	0.8	

Appendix C: Partial Data of Analysis

(Form October 2011 to June 2012, inclusive.)

Notation in Appendix C:

Date: Issue date of the tickers

E: Strike price

C: Call price

P: Put Price

S_0: Current stock price

y: Dividend yield

r: Risk-free rate (1-month Treasury Bills from Canada)

S0*e^(-yt): Present value of stock price discount by risk-free rate

E*e^(-rt): Stock price discount by dividend yield

d_c: Real call price minus the relative theoretical call price

d_p: Real put price minus the relative theoretical put price

Date	Ticker	E	C	P	S0	Y	r
2011/10/21	XIU	13	4.05	0.03	17.16	2.61%	0.86%
2011/10/21	XIU	13.5	3.52	0.03	17.16	2.61%	0.86%
2011/10/21	XIU	14	3.05	0.03	17.16	2.61%	0.86%
2011/10/21	XIU	14.5	2.53	0.03	17.16	2.61%	0.86%
2011/10/21	XIU	15	2.14	0.03	17.16	2.61%	0.86%
2011/10/21	XIU	15.5	1.53	0.03	17.16	2.61%	0.86%
2011/10/21	XIU	16	1.18	0.04	17.16	2.61%	0.86%
2011/10/21	XIU	16.5	0.6	0.05	17.16	2.61%	0.86%
2011/10/21	XIU	17	0.18	0.02	17.16	2.61%	0.86%
2011/10/21	XIU	17.5	0.03	0.42	17.16	2.61%	0.86%
2011/10/21	XIU	18	0.01	0.88	17.16	2.61%	0.86%
2011/10/21	XIU	18.5	0.03	1.64	17.16	2.61%	0.86%
2011/10/21	XIU	19	0.03	2.14	17.16	2.61%	0.86%
2011/10/21	XIU	19.5	0.03	2.65	17.16	2.61%	0.86%
2011/10/21	XIU	20	0.03	3.15	17.16	2.61%	0.86%
2011/10/21	XIU	20.5	0.03	3.65	17.16	2.61%	0.86%
2011/10/21	XIU	21	0.03	4.15	17.16	2.61%	0.86%
2011/10/21	XIU	21.5	0.03	4.65	17.16	2.61%	0.86%
2011/10/21	XIU	22	0.03	5.16	17.16	2.61%	0.86%
2011/10/21	XIU	22.5	0.03	5.66	17.16	2.61%	0.86%
2011/10/21	XIU	23	0.03	6.16	17.16	2.61%	0.86%
2011/11/18	XIU	13	4.07	0.03	17.01	2.61%	0.84%
2011/11/18	XIU	13.5	3.57	0.03	17.01	2.61%	0.84%
2011/11/18	XIU	14	3.07	0.03	17.01	2.61%	0.84%
2011/11/18	XIU	14.5	2.57	0.03	17.01	2.61%	0.84%
2011/11/18	XIU	15	2.07	0.05	17.01	2.61%	0.84%
2011/11/18	XIU	15.5	1.57	0.05	17.01	2.61%	0.84%
2011/11/18	XIU	16	1.01	0.05	17.01	2.61%	0.84%
2011/11/18	XIU	16.5	0.51	0.05	17.01	2.61%	0.84%
2011/11/18	XIU	17	0.07	0.01	17.01	2.61%	0.84%
2011/11/18	XIU	17.5	0.04	0.53	17.01	2.61%	0.84%
2011/11/18	XIU	18	0.02	0.96	17.01	2.61%	0.84%
2011/11/18	XIU	18.5	0.03	1.49	17.01	2.61%	0.84%
2011/11/18	XIU	19	0.03	2.03	17.01	2.61%	0.84%
2011/11/18	XIU	19.5	0.03	2.55	17.01	2.61%	0.84%
2011/11/18	XIU	20	0.03	3.05	17.01	2.61%	0.84%
2011/11/18	XIU	20.5	0.03	3.55	17.01	2.61%	0.84%
2011/11/18	XIU	21	0.03	4.05	17.01	2.61%	0.84%
2011/11/18	XIU	21.5	0.03	4.55	17.01	2.61%	0.84%
2011/11/18	XIU	22	0.03	5.05	17.01	2.61%	0.84%
2011/12/16	XIU	13	3.5	0.02	16.66	2.61%	0.77%
2011/12/16	XIU	13.5	3	0.02	16.66	2.61%	0.77%

2011/12/16	XIU	14	2.5	0.04	16.66	2.61%	0.77%
2011/12/16	XIU	14.5	2.02	0.04	16.66	2.61%	0.77%
2011/12/16	XIU	15	1.6	0.04	16.66	2.61%	0.77%
2011/12/16	XIU	15.5	1.06	0.03	16.66	2.61%	0.77%
2011/12/16	XIU	16	0.67	0.05	16.66	2.61%	0.77%
2011/12/16	XIU	16.5	0.2	0.04	16.66	2.61%	0.77%
2011/12/16	XIU	17	0.02	0.31	16.66	2.61%	0.77%
2011/12/16	XIU	17.5	0.02	0.82	16.66	2.61%	0.77%
2011/12/16	XIU	18	0.04	1.35	16.66	2.61%	0.77%
2011/12/16	XIU	18.5	0.04	1.9	16.66	2.61%	0.77%
2011/12/16	XIU	19	0.04	2.35	16.66	2.61%	0.77%
2011/12/16	XIU	19.5	0.05	2.82	16.66	2.61%	0.77%
2011/12/16	XIU	20	0.04	3.4	16.66	2.61%	0.77%
2011/12/16	XIU	20.5	0.04	4.06	16.66	2.61%	0.77%
2011/12/16	XIU	21	0.05	4.56	16.66	2.61%	0.77%
2011/12/16	XIU	21.5	0.05	5.06	16.66	2.61%	0.77%
2011/12/16	XIU	22	0.05	5.56	16.66	2.61%	0.77%
2011/12/16	XIU	22.5	0.05	6.08	16.66	2.61%	0.77%
2011/12/16	XIU	23	0.04	6.58	16.66	2.61%	0.77%
2011/12/16	XIU	23.5	0.04	7.08	16.66	2.61%	0.77%
2011/12/16	XIU	24	0.03	7.58	16.66	2.61%	0.77%
2012/1/20	XIU	13	4.8	0.1	17.77	2.61%	0.78%
2012/1/20	XIU	13.5	4.3	0.1	17.77	2.61%	0.78%
2012/1/20	XIU	14	3.79	0.1	17.77	2.61%	0.78%
2012/1/20	XIU	14.5	3.29	0.1	17.77	2.61%	0.78%
2012/1/20	XIU	15	2.8	0.1	17.77	2.61%	0.78%
2012/1/20	XIU	15.5	2.3	0.09	17.77	2.61%	0.78%
2012/1/20	XIU	16	1.8	0.04	17.77	2.61%	0.78%
2012/1/20	XIU	16.5	1.23	0.03	17.77	2.61%	0.78%
2012/1/20	XIU	17	0.77	0.02	17.77	2.61%	0.78%
2012/1/20	XIU	17.5	0.3	0.02	17.77	2.61%	0.78%
2012/1/20	XIU	18	0.04	0.23	17.77	2.61%	0.78%
2012/1/20	XIU	18.5	0.1	0.76	17.77	2.61%	0.78%
2012/1/20	XIU	19	0.1	1.2	17.77	2.61%	0.78%
2012/1/20	XIU	19.5	0.1	1.76	17.77	2.61%	0.78%
2012/1/20	XIU	20	0.1	2.29	17.77	2.61%	0.78%
2012/1/20	XIU	20.5	0.1	2.79	17.77	2.61%	0.78%
2012/1/20	XIU	21	0.1	3.29	17.77	2.61%	0.78%
2012/1/20	XIU	21.5	0.1	3.79	17.77	2.61%	0.78%
2012/1/20	XIU	22	0.1	4.28	17.77	2.61%	0.78%
2012/2/17	XIU	13	4.89	0.11	17.82	2.61%	0.87%
2012/2/17	XIU	13.5	4.39	0.11	17.82	2.61%	0.87%
2012/2/17	XIU	14	3.89	0.11	17.82	2.61%	0.87%

2012/2/17	XIU	14.5	3.39	0.11	17.82	2.61%	0.87%
2012/2/17	XIU	15	2.89	0.11	17.82	2.61%	0.87%
2012/2/17	XIU	15.5	2.39	0.11	17.82	2.61%	0.87%
2012/2/17	XIU	16	1.89	0.11	17.82	2.61%	0.87%
2012/2/17	XIU	16.5	1.39	0.03	17.82	2.61%	0.87%
2012/2/17	XIU	17	0.82	0.04	17.82	2.61%	0.87%
2012/2/17	XIU	17.5	0.36	0.03	17.82	2.61%	0.87%
2012/2/17	XIU	18	0.04	0.16	17.82	2.61%	0.87%
2012/2/17	XIU	18.5	0.1	0.66	17.82	2.61%	0.87%
2012/2/17	XIU	19	0.11	1.16	17.82	2.61%	0.87%
2012/2/17	XIU	19.5	0.11	1.66	17.82	2.61%	0.87%
2012/2/17	XIU	20	0.11	2.16	17.82	2.61%	0.87%
2012/2/17	XIU	20.5	0.11	2.66	17.82	2.61%	0.87%
2012/2/17	XIU	21	0.11	3.16	17.82	2.61%	0.87%
2012/2/17	XIU	21.5	0.11	3.66	17.82	2.61%	0.87%
2012/2/17	XIU	22	0.11	4.16	17.82	2.61%	0.87%
2012/3/16	XIU	10	7.87	0.01	17.94	2.61%	0.87%
2012/3/16	XIU	12	5.87	0.03	17.94	2.61%	0.87%
2012/3/16	XIU	13	4.87	0.09	17.94	2.61%	0.87%
2012/3/16	XIU	13.5	4.37	0.09	17.94	2.61%	0.87%
2012/3/16	XIU	14	3.95	0.09	17.94	2.61%	0.87%
2012/3/16	XIU	14.5	3.37	0.09	17.94	2.61%	0.87%
2012/3/16	XIU	15	2.87	0.06	17.94	2.61%	0.87%
2012/3/16	XIU	15.5	2.39	0.09	17.94	2.61%	0.87%
2012/3/16	XIU	16	1.87	0.09	17.94	2.61%	0.87%
2012/3/16	XIU	16.5	1.4	0.09	17.94	2.61%	0.87%
2012/3/16	XIU	17	0.98	0.09	17.94	2.61%	0.87%
2012/3/16	XIU	17.5	0.47	0.05	17.94	2.61%	0.87%
2012/3/16	XIU	18	0.03	0.02	17.94	2.61%	0.87%
2012/3/16	XIU	18.5	0.1	0.5	17.94	2.61%	0.87%
2012/3/16	XIU	19	0.11	0.99	17.94	2.61%	0.87%
2012/3/16	XIU	19.5	0.11	1.7	17.94	2.61%	0.87%
2012/3/16	XIU	20	0.03	2.01	17.94	2.61%	0.87%
2012/3/16	XIU	20.5	0.11	2.7	17.94	2.61%	0.87%
2012/3/16	XIU	21	0.11	3.2	17.94	2.61%	0.87%
2012/3/16	XIU	21.5	0.11	3.7	17.94	2.61%	0.87%
2012/3/16	XIU	22	0.11	4.2	17.94	2.61%	0.87%
2012/3/16	XIU	22.5	0.11	4.7	17.94	2.61%	0.87%
2012/3/16	XIU	23	0.11	5.2	17.94	2.61%	0.87%
2012/4/20	XIU	14	3.45	0.09	17.39	2.61%	0.98%
2012/4/20	XIU	14.5	2.95	0.09	17.39	2.61%	0.98%
2012/4/20	XIU	15	2.45	0.09	17.39	2.61%	0.98%
2012/4/20	XIU	15.5	1.95	0.09	17.39	2.61%	0.98%

2012/4/20	XIU	16	1.45	0.09	17.39	2.61%	0.98%
2012/4/20	XIU	16.5	0.95	0.09	17.39	2.61%	0.98%
2012/4/20	XIU	17	0.45	0.06	17.39	2.61%	0.98%
2012/4/20	XIU	17.5	0.07	0.09	17.39	2.61%	0.98%
2012/4/20	XIU	18	0.06	0.57	17.39	2.61%	0.98%
2012/4/20	XIU	18.5	0.09	1.12	17.39	2.61%	0.98%
2012/4/20	XIU	19	0.1	1.62	17.39	2.61%	0.98%
2012/4/20	XIU	19.5	0.1	2.12	17.39	2.61%	0.98%
2012/4/20	XIU	20	0.1	2.62	17.39	2.61%	0.98%
2012/4/20	XIU	20.5	0.1	3.12	17.39	2.61%	0.98%
2012/4/20	XIU	21	0.1	3.62	17.39	2.61%	0.98%
2012/4/20	XIU	21.5	0.1	4.12	17.39	2.61%	0.98%
2012/4/20	XIU	22	0.1	4.62	17.39	2.61%	0.98%
2012/5/18	XIU	14	2.23	0.1	16.12	2.61%	0.89%
2012/5/18	XIU	14.5	1.73	0.1	16.12	2.61%	0.89%
2012/5/18	XIU	15	1.23	0.1	16.12	2.61%	0.89%
2012/5/18	XIU	15.5	0.74	0.06	16.12	2.61%	0.89%
2012/5/18	XIU	16	0.26	0.11	16.12	2.61%	0.89%
2012/5/18	XIU	16.5	0.07	0.38	16.12	2.61%	0.89%
2012/5/18	XIU	17	0.03	0.71	16.12	2.61%	0.89%
2012/5/18	XIU	17.5	0.02	1.23	16.12	2.61%	0.89%
2012/5/18	XIU	18	0.02	1.65	16.12	2.61%	0.89%
2012/5/18	XIU	18.5	0.02	2.35	16.12	2.61%	0.89%
2012/5/18	XIU	19	0.1	2.85	16.12	2.61%	0.89%
2012/5/18	XIU	19.5	0.1	3.35	16.12	2.61%	0.89%
2012/5/18	XIU	20	0.1	3.85	16.12	2.61%	0.89%
2012/5/18	XIU	20.5	0.1	4.35	16.12	2.61%	0.89%
2012/5/18	XIU	21	0.1	4.85	16.12	2.61%	0.89%
2012/5/18	XIU	21.5	0.1	5.35	16.12	2.61%	0.89%
2012/5/18	XIU	22	0.1	5.85	16.12	2.61%	0.89%
2012/5/18	XIU	22.5	0.1	6.35	16.12	2.61%	0.89%
2012/6/15	XIU	13	3.54	0.1	16.61	2.61%	0.87%
2012/6/15	XIU	13.5	3.04	0.1	16.61	2.61%	0.87%
2012/6/15	XIU	14	2.54	0.1	16.61	2.61%	0.87%
2012/6/15	XIU	14.5	2.04	0.1	16.61	2.61%	0.87%
2012/6/15	XIU	15	1.54	0.12	16.61	2.61%	0.87%
2012/6/15	XIU	15.5	1.08	0.1	16.61	2.61%	0.87%
2012/6/15	XIU	16	0.66	0.05	16.61	2.61%	0.87%
2012/6/15	XIU	16.5	0.15	0.15	16.61	2.61%	0.87%
2012/6/15	XIU	17	0.02	0.42	16.61	2.61%	0.87%
2012/6/15	XIU	17.5	0.03	0.92	16.61	2.61%	0.87%
2012/6/15	XIU	18	0.03	1.36	16.61	2.61%	0.87%
2012/6/15	XIU	18.5	0.02	2.03	16.61	2.61%	0.87%

2012/6/15	XIU	19	0.03	2.53	16.61	2.61%	0.87%
2012/6/15	XIU	19.5	0.03	3.03	16.61	2.61%	0.87%
2012/6/15	XIU	20	0.03	3.53	16.61	2.61%	0.87%
2012/6/15	XIU	20.5	0.1	4.03	16.61	2.61%	0.87%
2012/6/15	XIU	21	0.1	4.53	16.61	2.61%	0.87%
2012/6/15	XIU	21.5	0.1	5.03	16.61	2.61%	0.87%
2012/6/15	XIU	22	0.1	5.53	16.61	2.61%	0.87%
2011/10/21	XFN	18	3.34	0.02	21.5	3.31%	0.86%
2011/10/21	XFN	19	2.33	0.02	21.5	3.31%	0.86%
2011/10/21	XFN	20	1.33	0.02	21.5	3.31%	0.86%
2011/10/21	XFN	21	0.5	0.07	21.5	3.31%	0.86%
2011/10/21	XFN	22	0.02	0.75	21.5	3.31%	0.86%
2011/10/21	XFN	23	0.02	1.51	21.5	3.31%	0.86%
2011/10/21	XFN	24	0.02	2.76	21.5	3.31%	0.86%
2011/10/21	XFN	25	0.02	3.75	21.5	3.31%	0.86%
2011/10/21	XFN	26	0.02	4.75	21.5	3.31%	0.86%
2011/10/21	XFN	27	0.02	5.75	21.5	3.31%	0.86%
2011/10/21	XFN	28	0.02	6.75	21.5	3.31%	0.86%
2011/11/18	XFN	18	2.29	0.04	20.25	3.31%	0.84%
2011/11/18	XFN	19	1.29	0.03	20.25	3.31%	0.84%
2011/11/18	XFN	20	0.34	0.14	20.25	3.31%	0.84%
2011/11/18	XFN	21	0.03	0.81	20.25	3.31%	0.84%
2011/11/18	XFN	22	0.03	1.81	20.25	3.31%	0.84%
2011/11/18	XFN	23	0.02	2.83	20.25	3.31%	0.84%
2011/11/18	XFN	24	0.03	3.8	20.25	3.31%	0.84%
2011/11/18	XFN	25	0.03	4.8	20.25	3.31%	0.84%
2011/11/18	XFN	26	0.03	5.8	20.25	3.31%	0.84%
2011/12/16	XFN	16	4.29	0.02	20.52	3.31%	0.77%
2011/12/16	XFN	17	3.29	0.02	20.52	3.31%	0.77%
2011/12/16	XFN	18	2.28	0.02	20.52	3.31%	0.77%
2011/12/16	XFN	19	1.28	0.02	20.52	3.31%	0.77%
2011/12/16	XFN	20	0.42	0.06	20.52	3.31%	0.77%
2011/12/16	XFN	21	0.01	0.78	20.52	3.31%	0.77%
2011/12/16	XFN	22	0.01	1.48	20.52	3.31%	0.77%
2011/12/16	XFN	23	0.02	2.79	20.52	3.31%	0.77%
2011/12/16	XFN	24	0.02	3.8	20.52	3.31%	0.77%
2011/12/16	XFN	25	0.02	4.8	20.52	3.31%	0.77%
2011/12/16	XFN	26	0.03	5.8	20.52	3.31%	0.77%
2011/12/16	XFN	27	0.02	6.8	20.52	3.31%	0.77%
2011/12/16	XFN	28	0.02	7.8	20.52	3.31%	0.77%
2011/12/16	XFN	29	0.02	8.8	20.52	3.31%	0.77%
2011/12/16	XFN	30	0.02	9.8	20.52	3.31%	0.77%
2012/1/20	XFN	16	6.29	0.02	22.43	3.31%	0.78%

2012/1/20	XFN	17	5.29	0.02	22.43	3.31%	0.78%
2012/1/20	XFN	18	4.29	0.02	22.43	3.31%	0.78%
2012/1/20	XFN	19	3.25	0.02	22.43	3.31%	0.78%
2012/1/20	XFN	20	2.36	0.02	22.43	3.31%	0.78%
2012/1/20	XFN	21	1.27	0.02	22.43	3.31%	0.78%
2012/1/20	XFN	22	0.39	0.05	22.43	3.31%	0.78%
2012/1/20	XFN	23	0.05	0.8	22.43	3.31%	0.78%
2012/1/20	XFN	24	0.05	1.8	22.43	3.31%	0.78%
2012/1/20	XFN	25	0.05	2.8	22.43	3.31%	0.78%
2012/1/20	XFN	26	0.05	3.8	22.43	3.31%	0.78%
2012/2/17	XFN	16	6.34	0.06	22.28	3.31%	0.87%
2012/2/17	XFN	17	5.34	0.06	22.28	3.31%	0.87%
2012/2/17	XFN	18	4.34	0.06	22.28	3.31%	0.87%
2012/2/17	XFN	19	3.34	0.06	22.28	3.31%	0.87%
2012/2/17	XFN	20	2.31	0.06	22.28	3.31%	0.87%
2012/2/17	XFN	21	1.25	0.06	22.28	3.31%	0.87%
2012/2/17	XFN	22	0	0.08	22.28	3.31%	0.87%
2012/2/17	XFN	23	0.06	0.75	22.28	3.31%	0.87%
2012/2/17	XFN	24	0.06	1.75	22.28	3.31%	0.87%
2012/2/17	XFN	25	0.06	2.75	22.28	3.31%	0.87%
2012/2/17	XFN	26	0.06	3.75	22.28	3.31%	0.87%
2012/2/17	XFN	27	0.06	4.75	22.28	3.31%	0.87%
2012/2/17	XFN	28	0.06	5.75	22.28	3.31%	0.87%
2012/3/16	XFN	16	7.41	0.14	23.49	3.31%	0.87%
2012/3/16	XFN	17	6.41	0.14	23.49	3.31%	0.87%
2012/3/16	XFN	18	5.41	0.14	23.49	3.31%	0.87%
2012/3/16	XFN	19	4.42	0.14	23.49	3.31%	0.87%
2012/3/16	XFN	20	3.42	0.02	23.49	3.31%	0.87%
2012/3/16	XFN	21	2.46	0.02	23.49	3.31%	0.87%
2012/3/16	XFN	22	1.42	0.02	23.49	3.31%	0.87%
2012/3/16	XFN	23	0.53	0.06	23.49	3.31%	0.87%
2012/3/16	XFN	24	0.14	0.63	23.49	3.31%	0.87%
2012/3/16	XFN	25	0.14	1.63	23.49	3.31%	0.87%
2012/3/16	XFN	26	0.14	2.63	23.49	3.31%	0.87%
2012/3/16	XFN	27	0.14	3.63	23.49	3.31%	0.87%
2012/3/16	XFN	28	0.14	4.63	23.49	3.31%	0.87%
2012/3/16	XFN	29	0.14	5.63	23.49	3.31%	0.87%
2012/4/20	XFN	18	5.39	0.14	23.34	3.31%	0.98%
2012/4/20	XFN	19	4.39	0.14	23.34	3.31%	0.98%
2012/4/20	XFN	20	3.39	0.14	23.34	3.31%	0.98%
2012/4/20	XFN	21	2.4	0.06	23.34	3.31%	0.98%
2012/4/20	XFN	22	1.4	0.04	23.34	3.31%	0.98%
2012/4/20	XFN	23	0.4	0.04	23.34	3.31%	0.98%

2012/4/20	XFN	24	0.02	0.67	23.34	3.31%	0.98%
2012/4/20	XFN	25	0.14	1.67	23.34	3.31%	0.98%
2012/4/20	XFN	26	0.14	2.67	23.34	3.31%	0.98%
2012/4/20	XFN	27	0.14	3.67	23.34	3.31%	0.98%
2012/4/20	XFN	28	0.14	4.67	23.34	3.31%	0.98%
2012/4/20	XFN	29	0.14	5.67	23.34	3.31%	0.98%
2012/5/18	XFN	18	3.53	0.14	21.34	3.31%	0.89%
2012/5/18	XFN	19	2.54	0.03	21.34	3.31%	0.89%
2012/5/18	XFN	20	1.54	0.03	21.34	3.31%	0.89%
2012/5/18	XFN	21	0.6	0.04	21.34	3.31%	0.89%
2012/5/18	XFN	22	0.05	0.51	21.34	3.31%	0.89%
2012/5/18	XFN	23	0.01	1.51	21.34	3.31%	0.89%
2012/5/18	XFN	24	0.03	2.53	21.34	3.31%	0.89%
2012/5/18	XFN	25	0.14	3.53	21.34	3.31%	0.89%
2012/5/18	XFN	26	0.14	4.53	21.34	3.31%	0.89%
2012/5/18	XFN	27	0.14	5.53	21.34	3.31%	0.89%
2012/5/18	XFN	28	0.14	6.53	21.34	3.31%	0.89%
2012/5/18	XFN	29	0.14	7.53	21.34	3.31%	0.89%
2012/6/15	XFN	14.5	6.82	0.14	21.41	3.31%	0.87%
2012/6/15	XFN	16	5.32	0.08	21.41	3.31%	0.87%
2012/6/15	XFN	17	4.31	0.08	21.41	3.31%	0.87%
2012/6/15	XFN	17.5	3.82	0.08	21.41	3.31%	0.87%
2012/6/15	XFN	18	3.32	0.1	21.41	3.31%	0.87%
2012/6/15	XFN	19	2.32	0.05	21.41	3.31%	0.87%
2012/6/15	XFN	20	1.32	0.04	21.41	3.31%	0.87%
2012/6/15	XFN	21	0.36	0.06	21.41	3.31%	0.87%
2012/6/15	XFN	22	0.02	0.63	21.41	3.31%	0.87%
2012/6/15	XFN	23	0.02	1.74	21.41	3.31%	0.87%
2012/6/15	XFN	24	0.03	2.74	21.41	3.31%	0.87%
2012/6/15	XFN	25	0.14	3.74	21.41	3.31%	0.87%
2012/6/15	XFN	26	0.14	4.74	21.41	3.31%	0.87%
2012/6/15	XFN	27	0.14	5.74	21.41	3.31%	0.87%
2012/6/15	XFN	28	0.14	6.74	21.41	3.31%	0.87%
2012/6/15	XFN	29	0.14	7.74	21.41	3.31%	0.87%
2011/10/21	XEG	11	5.59	0.02	16.79	2.12%	0.86%
2011/10/21	XEG	12	4.59	0.02	16.79	2.12%	0.86%
2011/10/21	XEG	13	3.59	0.06	16.79	2.12%	0.86%
2011/10/21	XEG	14	2.58	0.06	16.79	2.12%	0.86%
2011/10/21	XEG	15	1.58	0.06	16.79	2.12%	0.86%
2011/10/21	XEG	16	0.83	0.09	16.79	2.12%	0.86%
2011/10/21	XEG	17	0.02	0.52	16.79	2.12%	0.86%
2011/10/21	XEG	18	0.03	1.5	16.79	2.12%	0.86%
2011/10/21	XEG	19	0.02	2.5	16.79	2.12%	0.86%

2011/10/21	XEG	20	0.02	3.5	16.79	2.12%	0.86%
2011/10/21	XEG	21	0.02	4.5	16.79	2.12%	0.86%
2011/10/21	XEG	22	0.02	5.5	16.79	2.12%	0.86%
2011/10/21	XEG	23	0.02	6.5	16.79	2.12%	0.86%
2011/10/21	XEG	24	0.02	7.5	16.79	2.12%	0.86%
2011/11/18	XEG	11	5.95	0.04	16.87	2.12%	0.84%
2011/11/18	XEG	12	4.95	0.04	16.87	2.12%	0.84%
2011/11/18	XEG	13	3.95	0.04	16.87	2.12%	0.84%
2011/11/18	XEG	14	2.95	0.04	16.87	2.12%	0.84%
2011/11/18	XEG	14.5	2.45	0.04	16.87	2.12%	0.84%
2011/11/18	XEG	15	1.95	0.04	16.87	2.12%	0.84%
2011/11/18	XEG	16	0.95	0.05	16.87	2.12%	0.84%
2011/11/18	XEG	17	0.15	0.11	16.87	2.12%	0.84%
2011/11/18	XEG	18	0.04	1.18	16.87	2.12%	0.84%
2011/11/18	XEG	19	0.04	2.17	16.87	2.12%	0.84%
2011/11/18	XEG	20	0.04	3.15	16.87	2.12%	0.84%
2011/11/18	XEG	21	0.04	4.15	16.87	2.12%	0.84%
2011/11/18	XEG	22	0.04	5.15	16.87	2.12%	0.84%
2011/12/16	XEG	11	4.9	0.02	16.26	2.12%	0.77%
2011/12/16	XEG	12	3.9	0.02	16.26	2.12%	0.77%
2011/12/16	XEG	13	2.91	0.02	16.26	2.12%	0.77%
2011/12/16	XEG	14	2.06	0.04	16.26	2.12%	0.77%
2011/12/16	XEG	15	0.92	0.04	16.26	2.12%	0.77%
2011/12/16	XEG	16	0.2	0.24	16.26	2.12%	0.77%
2011/12/16	XEG	17	0.02	0.81	16.26	2.12%	0.77%
2011/12/16	XEG	18	0.02	1.96	16.26	2.12%	0.77%
2011/12/16	XEG	19	0.02	0	16.26	2.12%	0.77%
2011/12/16	XEG	20	0.02	3.9	16.26	2.12%	0.77%
2011/12/16	XEG	21	0.02	5.18	16.26	2.12%	0.77%
2011/12/16	XEG	22	0.02	6.19	16.26	2.12%	0.77%
2011/12/16	XEG	23	0.02	7.19	16.26	2.12%	0.77%
2011/12/16	XEG	24	0.02	8.17	16.26	2.12%	0.77%
2011/12/16	XEG	25	0.02	9.18	16.26	2.12%	0.77%
2011/12/16	XEG	26	0.02	10.18	16.26	2.12%	0.77%
2012/1/20	XEG	14	3.45	0.04	17.35	2.12%	0.78%
2012/1/20	XEG	15	2.45	0.04	17.35	2.12%	0.78%
2012/1/20	XEG	16	1.45	0.04	17.35	2.12%	0.78%
2012/1/20	XEG	17	0.38	0.04	17.35	2.12%	0.78%
2012/1/20	XEG	18	0.04	0.65	17.35	2.12%	0.78%
2012/1/20	XEG	19	0.04	1.65	17.35	2.12%	0.78%
2012/1/20	XEG	20	0.04	2.65	17.35	2.12%	0.78%
2012/2/17	XEG	14	3.8	0.05	17.87	2.12%	0.87%
2012/2/17	XEG	15	2.8	0.05	17.87	2.12%	0.87%

2012/2/17	XEG	16	1.8	0.05	17.87	2.12%	0.87%
2012/2/17	XEG	17	0.86	0.03	17.87	2.12%	0.87%
2012/2/17	XEG	18	0.01	0.27	17.87	2.12%	0.87%
2012/2/17	XEG	19	0.05	1.26	17.87	2.12%	0.87%
2012/2/17	XEG	20	0.05	2.26	17.87	2.12%	0.87%
2012/3/16	XEG	10	7.19	0.09	17.32	2.12%	0.87%
2012/3/16	XEG	11	6.19	0.1	17.32	2.12%	0.87%
2012/3/16	XEG	12	5.25	0.09	17.32	2.12%	0.87%
2012/3/16	XEG	13	4.19	0.1	17.32	2.12%	0.87%
2012/3/16	XEG	14	3.19	0.09	17.32	2.12%	0.87%
2012/3/16	XEG	15	2.22	0.09	17.32	2.12%	0.87%
2012/3/16	XEG	16	1.27	0.09	17.32	2.12%	0.87%
2012/3/16	XEG	17	0.29	0.12	17.32	2.12%	0.87%
2012/3/16	XEG	18	0.06	0.87	17.32	2.12%	0.87%
2012/3/16	XEG	19	0.09	1.74	17.32	2.12%	0.87%
2012/3/16	XEG	20	0.04	2.71	17.32	2.12%	0.87%
2012/3/16	XEG	21	0.1	3.75	17.32	2.12%	0.87%
2012/3/16	XEG	22	0.03	4.88	17.32	2.12%	0.87%
2012/3/16	XEG	23	0.1	5.88	17.32	2.12%	0.87%
2012/3/16	XEG	24	0.1	6.88	17.32	2.12%	0.87%
2012/3/16	XEG	25	0.1	7.88	17.32	2.12%	0.87%
2012/4/20	XEG	14	1.82	0.1	15.76	2.12%	0.98%
2012/4/20	XEG	15	0.85	0.1	15.76	2.12%	0.98%
2012/4/20	XEG	16	0.1	0.23	15.76	2.12%	0.98%
2012/4/20	XEG	17	0.1	1.25	15.76	2.12%	0.98%
2012/4/20	XEG	18	0.1	2.26	15.76	2.12%	0.98%
2012/4/20	XEG	19	0.1	0	15.76	2.12%	0.98%
2012/4/20	XEG	20	0.1	4.25	15.76	2.12%	0.98%
2012/5/18	XEG	13	1.57	0.09	14.58	2.12%	0.89%
2012/5/18	XEG	14	0.7	0.05	14.58	2.12%	0.89%
2012/5/18	XEG	15	0.07	0.52	14.58	2.12%	0.89%
2012/5/18	XEG	16	0.03	1.51	14.58	2.12%	0.89%
2012/5/18	XEG	17	0.03	2.51	14.58	2.12%	0.89%
2012/5/18	XEG	18	0.03	3.51	14.58	2.12%	0.89%
2012/5/18	XEG	19	0.03	4.51	14.58	2.12%	0.89%
2012/5/18	XEG	20	0.03	5.51	14.58	2.12%	0.89%
2012/6/15	XEG	11	3.58	0.09	14.82	2.12%	0.87%
2012/6/15	XEG	12	2.58	0.01	14.82	2.12%	0.87%
2012/6/15	XEG	13	1.58	0.11	14.82	2.12%	0.87%
2012/6/15	XEG	14	0.67	0.04	14.82	2.12%	0.87%
2012/6/15	XEG	14.5	0.26	0.03	14.82	2.12%	0.87%
2012/6/15	XEG	15	0.04	0.23	14.82	2.12%	0.87%
2012/6/15	XEG	16	0.02	1.35	14.82	2.12%	0.87%

2012/6/15	XEG	17	0.09	2.48	14.82	2.12%	0.87%
2012/6/15	XEG	18	0.05	3.48	14.82	2.12%	0.87%
2012/6/15	XEG	19	0.06	4.48	14.82	2.12%	0.87%
2012/6/15	XEG	20	0.04	5.48	14.82	2.12%	0.87%
2011/10/21	XGD	18	5.15	0.04	23.22	0.66%	0.86%
2011/10/21	XGD	19	4.15	0.04	23.22	0.66%	0.86%
2011/10/21	XGD	20	3.15	0.04	23.22	0.66%	0.86%
2011/10/21	XGD	21	2.14	0.08	23.22	0.66%	0.86%
2011/10/21	XGD	22	1.17	0.1	23.22	0.66%	0.86%
2011/10/21	XGD	23	0.3	0.26	23.22	0.66%	0.86%
2011/10/21	XGD	24	0.1	1.08	23.22	0.66%	0.86%
2011/10/21	XGD	25	0.04	2.02	23.22	0.66%	0.86%
2011/10/21	XGD	26	0.03	3.05	23.22	0.66%	0.86%
2011/10/21	XGD	27	0.03	4.05	23.22	0.66%	0.86%
2011/10/21	XGD	28	0.04	5.05	23.22	0.66%	0.86%
2011/10/21	XGD	29	0.04	6.05	23.22	0.66%	0.86%
2011/10/21	XGD	30	0.05	7.05	23.22	0.66%	0.86%
2011/10/21	XGD	32	0.05	9.05	23.22	0.66%	0.86%
2011/10/21	XGD	34	0.05	11.05	23.22	0.66%	0.86%
2011/11/18	XGD	18	7.49	0.03	25.05	0.66%	0.84%
2011/11/18	XGD	19	6.49	0.03	25.05	0.66%	0.84%
2011/11/18	XGD	20	5.49	0.03	25.05	0.66%	0.84%
2011/11/18	XGD	21	4.49	0.03	25.05	0.66%	0.84%
2011/11/18	XGD	22	3.49	0.03	25.05	0.66%	0.84%
2011/11/18	XGD	23	2.48	0.03	25.05	0.66%	0.84%
2011/11/18	XGD	24	1.46	0.05	25.05	0.66%	0.84%
2011/11/18	XGD	25	0.45	0.18	25.05	0.66%	0.84%
2011/11/18	XGD	26	0.08	0.75	25.05	0.66%	0.84%
2011/11/18	XGD	27	0.05	1.71	25.05	0.66%	0.84%
2011/11/18	XGD	28	0.05	3	25.05	0.66%	0.84%
2011/11/18	XGD	29	0.05	3.7	25.05	0.66%	0.84%
2011/11/18	XGD	30	0.08	4.7	25.05	0.66%	0.84%
2011/11/18	XGD	32	0.08	6.7	25.05	0.66%	0.84%
2011/11/18	XGD	34	0.08	8.7	25.05	0.66%	0.84%
2011/12/16	XGD	18	5.06	0.02	23.12	0.66%	0.77%
2011/12/16	XGD	19	4.05	0.02	23.12	0.66%	0.77%
2011/12/16	XGD	20	3	0.03	23.12	0.66%	0.77%
2011/12/16	XGD	21	1.73	0.03	23.12	0.66%	0.77%
2011/12/16	XGD	22	1.1	0.06	23.12	0.66%	0.77%
2011/12/16	XGD	23	0.25	0.1	23.12	0.66%	0.77%
2011/12/16	XGD	24	0.03	1.39	23.12	0.66%	0.77%
2011/12/16	XGD	25	0.03	2.38	23.12	0.66%	0.77%
2011/12/16	XGD	26	0.03	2.9	23.12	0.66%	0.77%

2011/12/16	XGD	27	0.04	4.4	23.12	0.66%	0.77%
2011/12/16	XGD	28	0.04	5.4	23.12	0.66%	0.77%
2011/12/16	XGD	29	0.04	6.4	23.12	0.66%	0.77%
2011/12/16	XGD	30	0.02	7.4	23.12	0.66%	0.77%
2011/12/16	XGD	32	0.02	9.4	23.12	0.66%	0.77%
2011/12/16	XGD	34	0.03	11.4	23.12	0.66%	0.77%
2012/1/20	XGD	18	4.8	0.06	22.76	0.66%	0.78%
2012/1/20	XGD	19	3.8	0.06	22.76	0.66%	0.78%
2012/1/20	XGD	20	2.79	0.06	22.76	0.66%	0.78%
2012/1/20	XGD	21	1.79	0.07	22.76	0.66%	0.78%
2012/1/20	XGD	22	0.8	0.05	22.76	0.66%	0.78%
2012/1/20	XGD	23	0.1	0.26	22.76	0.66%	0.78%
2012/1/20	XGD	24	0.06	0	22.76	0.66%	0.78%
2012/1/20	XGD	25	0.06	2.34	22.76	0.66%	0.78%
2012/1/20	XGD	26	0.06	3.35	22.76	0.66%	0.78%
2012/1/20	XGD	27	0.06	4.35	22.76	0.66%	0.78%
2012/1/20	XGD	28	0.06	5.35	22.76	0.66%	0.78%
2012/1/20	XGD	29	0.06	6.35	22.76	0.66%	0.78%
2012/1/20	XGD	30	0.06	7.35	22.76	0.66%	0.78%
2012/1/20	XGD	32	0.06	9.35	22.76	0.66%	0.78%
2012/2/17	XGD	18	5.4	0.07	23.05	0.66%	0.87%
2012/2/17	XGD	19	4.4	0.07	23.05	0.66%	0.87%
2012/2/17	XGD	20	3.4	0.07	23.05	0.66%	0.87%
2012/2/17	XGD	21	2.4	0.07	23.05	0.66%	0.87%
2012/2/17	XGD	22	1.4	0.05	23.05	0.66%	0.87%
2012/2/17	XGD	23	0.07	0.15	23.05	0.66%	0.87%
2012/2/17	XGD	24	0.04	0.71	23.05	0.66%	0.87%
2012/2/17	XGD	25	0.07	1.74	23.05	0.66%	0.87%
2012/2/17	XGD	26	0.07	2.74	23.05	0.66%	0.87%
2012/2/17	XGD	27	0.07	3.7	23.05	0.66%	0.87%
2012/2/17	XGD	28	0.07	4.7	23.05	0.66%	0.87%
2012/2/17	XGD	29	0.07	5.7	23.05	0.66%	0.87%
2012/2/17	XGD	30	0.07	6.7	23.05	0.66%	0.87%
2012/3/16	XGD	14	7.25	0.09	21.14	0.66%	0.87%
2012/3/16	XGD	16	5.25	0.09	21.14	0.66%	0.87%
2012/3/16	XGD	18	3.1	0.13	21.14	0.66%	0.87%
2012/3/16	XGD	19	2.25	0.13	21.14	0.66%	0.87%
2012/3/16	XGD	20	1.06	0.14	21.14	0.66%	0.87%
2012/3/16	XGD	21	0.29	0.08	21.14	0.66%	0.87%
2012/3/16	XGD	22	0.04	0.77	21.14	0.66%	0.87%
2012/3/16	XGD	23	0.09	1.91	21.14	0.66%	0.87%
2012/3/16	XGD	24	0.09	2.9	21.14	0.66%	0.87%
2012/3/16	XGD	25	0.09	3.85	21.14	0.66%	0.87%

2012/3/16	XGD	26	0.09	4.85	21.14	0.66%	0.87%
2012/3/16	XGD	27	0.12	5.85	21.14	0.66%	0.87%
2012/3/16	XGD	28	0.14	6.85	21.14	0.66%	0.87%
2012/3/16	XGD	29	0.14	7.85	21.14	0.66%	0.87%
2012/3/16	XGD	30	0.14	8.85	21.14	0.66%	0.87%
2012/3/16	XGD	32	0.14	10.85	21.14	0.66%	0.87%
2012/3/16	XGD	34	0.14	12.85	21.14	0.66%	0.87%
2012/4/20	XGD	18	1.66	0.13	19.4	0.66%	0.98%
2012/4/20	XGD	19	0.67	0.04	19.4	0.66%	0.98%
2012/4/20	XGD	20	0.09	0.47	19.4	0.66%	0.98%
2012/4/20	XGD	21	0.1	1.31	19.4	0.66%	0.98%
2012/4/20	XGD	22	0.09	2.61	19.4	0.66%	0.98%
2012/4/20	XGD	23	0.09	3.47	19.4	0.66%	0.98%
2012/4/20	XGD	24	0.09	4.47	19.4	0.66%	0.98%
2012/4/20	XGD	25	0.09	5.47	19.4	0.66%	0.98%
2012/4/20	XGD	26	0.09	6.47	19.4	0.66%	0.98%
2012/4/20	XGD	27	0.09	7.47	19.4	0.66%	0.98%
2012/5/18	XGD	16	2.2	0.13	17.9	0.66%	0.89%
2012/5/18	XGD	17	0.8	0.07	17.9	0.66%	0.89%
2012/5/18	XGD	18	0.25	0.38	17.9	0.66%	0.89%
2012/5/18	XGD	19	0.03	1.34	17.9	0.66%	0.89%
2012/5/18	XGD	20	0.02	2.34	17.9	0.66%	0.89%
2012/5/18	XGD	21	0.02	3.34	17.9	0.66%	0.89%
2012/5/18	XGD	22	0.02	4.34	17.9	0.66%	0.89%
2012/5/18	XGD	23	0.02	5.34	17.9	0.66%	0.89%
2012/5/18	XGD	24	0.02	6.33	17.9	0.66%	0.89%
2012/5/18	XGD	25	0.02	7.34	17.9	0.66%	0.89%
2012/5/18	XGD	26	0.02	8.33	17.9	0.66%	0.89%
2012/6/15	XGD	15	5.22	0.13	20.1	0.66%	0.87%
2012/6/15	XGD	16	4.23	0.13	20.1	0.66%	0.87%
2012/6/15	XGD	17	3.23	0.14	20.1	0.66%	0.87%
2012/6/15	XGD	18	2.22	0.02	20.1	0.66%	0.87%
2012/6/15	XGD	19	0	0.14	20.1	0.66%	0.87%
2012/6/15	XGD	20	0.16	0.14	20.1	0.66%	0.87%
2012/6/15	XGD	21	0.03	0.89	20.1	0.66%	0.87%
2012/6/15	XGD	22	0.14	1.96	20.1	0.66%	0.87%
2012/6/15	XGD	23	0.13	2.89	20.1	0.66%	0.87%
2012/6/15	XGD	24	0.13	3.89	20.1	0.66%	0.87%
2012/6/15	XGD	25	0.14	4.89	20.1	0.66%	0.87%
2012/6/15	XGD	26	0.13	5.89	20.1	0.66%	0.87%
2012/6/15	XGD	27	0.13	6.89	20.1	0.66%	0.87%
2012/6/15	XGD	28	0.13	7.89	20.1	0.66%	0.87%
2012/6/15	XGD	29	0.13	8.89	20.1	0.66%	0.87%

2012/6/15	XGD	30	0.13	9.89	20.1	0.66%	0.87%
2012/6/15	XGD	32	0.13	11.9	20.1	0.66%	0.87%
2012/6/15	XGD	34	0.03	13.9	20.1	0.66%	0.87%
2011/10/21	GAS	22	2.4	0.25	22.16	0.00%	0.86%
2011/10/21	GAS	23	0.25	2.4	22.16	0.00%	0.86%
2011/10/21	GAS	24	0.25	4.4	22.16	0.00%	0.86%
2011/10/21	GAS	25	0.25	5.4	22.16	0.00%	0.86%
2011/10/21	GAS	26	0.25	6.4	22.16	0.00%	0.86%
2011/10/21	GAS	27	0.25	5	22.16	0.00%	0.86%
2011/10/21	GAS	28	0.25	6.05	22.16	0.00%	0.86%
2011/11/18	GAS	20	3.85	0.2	20.49	0.00%	0.84%
2011/11/18	GAS	21	0.2	1.95	20.49	0.00%	0.84%
2011/11/18	GAS	22	0.85	4.95	20.49	0.00%	0.84%
2011/11/18	GAS	23	0.85	5.95	20.49	0.00%	0.84%
2011/11/18	GAS	24	0.8	6.9	20.49	0.00%	0.84%
2011/11/18	GAS	25	0.2	4.5	20.49	0.00%	0.84%
2011/11/18	GAS	26	0.8	5.5	20.49	0.00%	0.84%
2011/12/16	GAS	19	0.35	0.5	18.44	0.00%	0.77%
2011/12/16	GAS	20	0.2	1.4	18.44	0.00%	0.77%
2011/12/16	GAS	21	0.2	2.4	18.44	0.00%	0.77%
2011/12/16	GAS	22	0.2	3.4	18.44	0.00%	0.77%
2011/12/16	GAS	23	0.2	4.4	18.44	0.00%	0.77%
2011/12/16	GAS	24	0.2	5.4	18.44	0.00%	0.77%
2011/12/16	GAS	25	0.2	6.4	18.44	0.00%	0.77%
2011/12/16	GAS	26	0.2	7.4	18.44	0.00%	0.77%
2011/12/16	GAS	27	0.2	8.4	18.44	0.00%	0.77%
2011/12/16	GAS	28	0.2	9.4	18.44	0.00%	0.77%
2011/12/16	GAS	29	0.2	10.4	18.44	0.00%	0.77%
2011/12/16	GAS	30	0.2	11.5	18.44	0.00%	0.77%
2011/12/16	GAS	32	0.2	13.5	18.44	0.00%	0.77%
2011/12/16	GAS	34	0.2	15.5	18.44	0.00%	0.77%
2012/1/20	GAS	15	0.25	5.5	13.6	0.00%	0.78%
2012/1/20	GAS	16	1.05	3.2	13.6	0.00%	0.78%
2012/1/20	GAS	17	1.05	4.2	13.6	0.00%	0.78%
2012/1/20	GAS	18	1.05	5.2	13.6	0.00%	0.78%
2012/1/20	GAS	19	1.05	6.35	13.6	0.00%	0.78%
2012/1/20	GAS	20	1.05	7.35	13.6	0.00%	0.78%
2012/1/20	GAS	21	0.2	8.35	13.6	0.00%	0.78%
2012/1/20	GAS	22	1.05	9.35	13.6	0.00%	0.78%
2012/1/20	GAS	23	1.05	10.35	13.6	0.00%	0.78%
2012/1/20	GAS	24	1.05	11.8	13.6	0.00%	0.78%
2012/2/17	GAS	11	2.15	0.2	13.07	0.00%	0.87%
2012/2/17	GAS	12	1.15	0.2	13.07	0.00%	0.87%

2012/2/17	GAS	13	0.25	0.45	13.07	0.00%	0.87%
2012/2/17	GAS	14	0.2	1.45	13.07	0.00%	0.87%
2012/2/17	GAS	15	0.2	2.45	13.07	0.00%	0.87%
2012/2/17	GAS	16	0.2	3.45	13.07	0.00%	0.87%
2012/2/17	GAS	17	0.2	4.45	13.07	0.00%	0.87%
2012/2/17	GAS	18	0.2	5.5	13.07	0.00%	0.87%
2012/2/17	GAS	19	0.2	6.5	13.07	0.00%	0.87%
2012/2/17	GAS	20	0.2	7.5	13.07	0.00%	0.87%
2012/2/17	GAS	21	0.2	8.5	13.07	0.00%	0.87%
2012/2/17	GAS	22	0.2	9.5	13.07	0.00%	0.87%
2012/2/17	GAS	23	0.2	10.5	13.07	0.00%	0.87%
2012/3/16	GAS	9	2.1	1.15	11.04	0.00%	0.87%
2012/3/16	GAS	10	1.1	1.2	11.04	0.00%	0.87%
2012/3/16	GAS	11	1.45	2	11.04	0.00%	0.87%
2012/3/16	GAS	12	1.15	1.3	11.04	0.00%	0.87%
2012/3/16	GAS	13	1.15	2.3	11.04	0.00%	0.87%
2012/3/16	GAS	14	1.15	3.4	11.04	0.00%	0.87%
2012/3/16	GAS	15	1.15	4.4	11.04	0.00%	0.87%
2012/3/16	GAS	16	1.15	5.4	11.04	0.00%	0.87%
2012/3/16	GAS	17	1.15	6.4	11.04	0.00%	0.87%
2012/3/16	GAS	18	1.15	7.4	11.04	0.00%	0.87%
2012/3/16	GAS	19	1.15	8.4	11.04	0.00%	0.87%
2012/3/16	GAS	20	1.15	9.4	11.04	0.00%	0.87%
2012/3/16	GAS	21	1.15	10.4	11.04	0.00%	0.87%
2012/3/16	GAS	22	1.15	11.55	11.04	0.00%	0.87%
2012/3/16	GAS	23	1.15	12.55	11.04	0.00%	0.87%
2012/3/16	GAS	24	1.15	13.55	11.04	0.00%	0.87%
2012/3/16	GAS	25	1.15	14.55	11.04	0.00%	0.87%
2012/3/16	GAS	26	1.15	15.55	11.04	0.00%	0.87%
2012/3/16	GAS	27	1.15	16.55	11.04	0.00%	0.87%
2012/3/16	GAS	28	1.15	17.55	11.04	0.00%	0.87%
2012/3/16	GAS	29	1.15	18.55	11.04	0.00%	0.87%
2012/3/16	GAS	30	1.15	19.55	11.04	0.00%	0.87%
2012/3/16	GAS	32	1.15	21.5	11.04	0.00%	0.87%
2012/3/16	GAS	34	1.15	23.5	11.04	0.00%	0.87%
2012/4/20	GAS	8	1.2	0.7	8.6	0.00%	0.98%
2012/4/20	GAS	9	0.7	0.75	8.6	0.00%	0.98%
2012/4/20	GAS	10	0.7	1.75	8.6	0.00%	0.98%
2012/4/20	GAS	11	0.7	2.95	8.6	0.00%	0.98%
2012/4/20	GAS	12	0.7	3.95	8.6	0.00%	0.98%
2012/4/20	GAS	13	0.7	4.95	8.6	0.00%	0.98%
2012/4/20	GAS	14	0.7	6.1	8.6	0.00%	0.98%
2012/4/20	GAS	15	0.7	7.1	8.6	0.00%	0.98%

2012/4/20	GAS	16	0.7	8.1	8.6	0.00%	0.98%
2012/4/20	GAS	17	0.7	9.1	8.6	0.00%	0.98%
2012/5/18	GAS	7	5.35	1.2	12.31	0.00%	0.89%
2012/5/18	GAS	8	7.7	1.2	12.31	0.00%	0.89%
2012/5/18	GAS	9	3.35	1.2	12.31	0.00%	0.89%
2012/5/18	GAS	10	5.8	1.2	12.31	0.00%	0.89%
2012/5/18	GAS	11	4.05	1.1	12.31	0.00%	0.89%
2012/5/18	GAS	12	1.1	1.5	12.31	0.00%	0.89%
2012/5/18	GAS	13	1.2	5	12.31	0.00%	0.89%
2012/5/18	GAS	14	1.2	6.2	12.31	0.00%	0.89%
2012/5/18	GAS	15	1.2	7.2	12.31	0.00%	0.89%
2012/6/15	GAS	7	3.5	4.1	10.06	0.00%	0.87%
2012/6/15	GAS	8	2.5	4.1	10.06	0.00%	0.87%
2012/6/15	GAS	9	1.35	3.7	10.06	0.00%	0.87%
2012/6/15	GAS	10	2	0.9	10.06	0.00%	0.87%
2012/6/15	GAS	11	4.1	1.6	10.06	0.00%	0.87%
2012/6/15	GAS	12	4.1	3.05	10.06	0.00%	0.87%
2012/6/15	GAS	13	4.1	4.05	10.06	0.00%	0.87%
2012/6/15	GAS	14	4.1	5.05	10.06	0.00%	0.87%
2012/6/15	GAS	15	4.1	6.05	10.06	0.00%	0.87%
2012/6/15	GAS	16	4.1	7.05	10.06	0.00%	0.87%
2012/6/15	GAS	17	4.1	8.05	10.06	0.00%	0.87%
2012/6/15	GAS	18	4.1	9.05	10.06	0.00%	0.87%
2012/6/15	GAS	19	4.1	9.3	10.06	0.00%	0.87%
2012/6/15	GAS	20	4.1	11.35	10.06	0.00%	0.87%
2012/6/15	GAS	21	4.1	12.35	10.06	0.00%	0.87%
2012/6/15	GAS	22	4.1	13.35	10.06	0.00%	0.87%
2012/6/15	GAS	23	4.1	14.2	10.06	0.00%	0.87%
2012/6/15	GAS	24	4.1	15.2	10.06	0.00%	0.87%
2012/6/15	GAS	25	4.1	16.2	10.06	0.00%	0.87%
2012/6/15	GAS	26	4.1	17.2	10.06	0.00%	0.87%
2012/6/15	GAS	27	4.1	18.2	10.06	0.00%	0.87%

Date	Ticker	S0*e^(-yt)	E*e^(-rt)	dc	dp
2011/10/21	XIU	17.15877	12.99627	0.003726	12.99627
2011/10/21	XIU	17.15877	13.49613	0.003869	13.49613
2011/10/21	XIU	17.15877	13.99599	0.004013	13.99599
2011/10/21	XIU	17.15877	14.49584	0.004156	14.49584
2011/10/21	XIU	17.15877	14.9957	0.004299	14.9957
2011/10/21	XIU	17.15877	15.49556	0.004443	15.49556
2011/10/21	XIU	17.15877	15.99541	0.004586	15.99541
2011/10/21	XIU	17.15877	16.49527	0.004729	16.49527
2011/10/21	XIU	17.15877	16.99513	0.004873	16.99513
2011/10/21	XIU	17.15877	17.49498	0.005016	17.49498
2011/10/21	XIU	17.15877	17.99484	0.005159	17.99484
2011/10/21	XIU	17.15877	18.4947	0.005303	18.4947
2011/10/21	XIU	17.15877	18.99455	0.005446	18.99455
2011/10/21	XIU	17.15877	19.49441	0.005589	19.49441
2011/10/21	XIU	17.15877	19.99427	0.005733	19.99427
2011/10/21	XIU	17.15877	20.49412	0.005876	20.49412
2011/10/21	XIU	17.15877	20.99398	0.006019	20.99398
2011/10/21	XIU	17.15877	21.49384	0.006162	21.49384
2011/10/21	XIU	17.15877	21.99369	0.006306	21.99369
2011/10/21	XIU	17.15877	22.49355	0.006449	22.49355
2011/10/21	XIU	17.15877	22.99341	0.006592	22.99341
2011/11/18	XIU	17.00878	12.99636	0.003639	12.99636
2011/11/18	XIU	17.00878	13.49622	0.003779	13.49622
2011/11/18	XIU	17.00878	13.99608	0.003919	13.99608
2011/11/18	XIU	17.00878	14.49594	0.004059	14.49594
2011/11/18	XIU	17.00878	14.9958	0.004199	14.9958
2011/11/18	XIU	17.00878	15.49566	0.004339	15.49566
2011/11/18	XIU	17.00878	15.99552	0.004479	15.99552
2011/11/18	XIU	17.00878	16.49538	0.004619	16.49538
2011/11/18	XIU	17.00878	16.99524	0.004759	16.99524
2011/11/18	XIU	17.00878	17.4951	0.004899	17.4951
2011/11/18	XIU	17.00878	17.99496	0.005039	17.99496
2011/11/18	XIU	17.00878	18.49482	0.005179	18.49482
2011/11/18	XIU	17.00878	18.99468	0.005319	18.99468
2011/11/18	XIU	17.00878	19.49454	0.005459	19.49454
2011/11/18	XIU	17.00878	19.9944	0.005599	19.9944
2011/11/18	XIU	17.00878	20.49426	0.005739	20.49426
2011/11/18	XIU	17.00878	20.99412	0.005879	20.99412
2011/11/18	XIU	17.00878	21.49398	0.006019	21.49398
2011/11/18	XIU	17.00878	21.99384	0.006159	21.99384
2011/12/16	XIU	16.65881	12.99666	0.003336	12.99666
2011/12/16	XIU	16.65881	13.49654	0.003465	13.49654
2011/12/16	XIU	16.65881	13.99641	0.003593	13.99641

2011/12/16	XIU	16.65881	14.49628	0.003721	14.49628
2011/12/16	XIU	16.65881	14.99615	0.00385	14.99615
2011/12/16	XIU	16.65881	15.49602	0.003978	15.49602
2011/12/16	XIU	16.65881	15.99589	0.004106	15.99589
2011/12/16	XIU	16.65881	16.49577	0.004234	16.49577
2011/12/16	XIU	16.65881	16.99564	0.004363	16.99564
2011/12/16	XIU	16.65881	17.49551	0.004491	17.49551
2011/12/16	XIU	16.65881	17.99538	0.004619	17.99538
2011/12/16	XIU	16.65881	18.49525	0.004748	18.49525
2011/12/16	XIU	16.65881	18.99512	0.004876	18.99512
2011/12/16	XIU	16.65881	19.495	0.005004	19.495
2011/12/16	XIU	16.65881	19.99487	0.005133	19.99487
2011/12/16	XIU	16.65881	20.49474	0.005261	20.49474
2011/12/16	XIU	16.65881	20.99461	0.005389	20.99461
2011/12/16	XIU	16.65881	21.49448	0.005518	21.49448
2011/12/16	XIU	16.65881	21.99435	0.005646	21.99435
2011/12/16	XIU	16.65881	22.49423	0.005774	22.49423
2011/12/16	XIU	16.65881	22.9941	0.005903	22.9941
2011/12/16	XIU	16.65881	23.49397	0.006031	23.49397
2011/12/16	XIU	16.65881	23.99384	0.006159	23.99384
2012/1/20	XIU	17.76873	12.99662	0.00338	12.99662
2012/1/20	XIU	17.76873	13.49649	0.00351	13.49649
2012/1/20	XIU	17.76873	13.99636	0.00364	13.99636
2012/1/20	XIU	17.76873	14.49623	0.00377	14.49623
2012/1/20	XIU	17.76873	14.9961	0.003899	14.9961
2012/1/20	XIU	17.76873	15.49597	0.004029	15.49597
2012/1/20	XIU	17.76873	15.99584	0.004159	15.99584
2012/1/20	XIU	17.76873	16.49571	0.004289	16.49571
2012/1/20	XIU	17.76873	16.99558	0.004419	16.99558
2012/1/20	XIU	17.76873	17.49545	0.004549	17.49545
2012/1/20	XIU	17.76873	17.99532	0.004679	17.99532
2012/1/20	XIU	17.76873	18.49519	0.004809	18.49519
2012/1/20	XIU	17.76873	18.99506	0.004939	18.99506
2012/1/20	XIU	17.76873	19.49493	0.005069	19.49493
2012/1/20	XIU	17.76873	19.9948	0.005199	19.9948
2012/1/20	XIU	17.76873	20.49467	0.005329	20.49467
2012/1/20	XIU	17.76873	20.99454	0.005459	20.99454
2012/1/20	XIU	17.76873	21.49441	0.005589	21.49441
2012/1/20	XIU	17.76873	21.99428	0.005719	21.99428
2012/2/17	XIU	17.81873	12.99623	0.003769	12.99623
2012/2/17	XIU	17.81873	13.49609	0.003914	13.49609
2012/2/17	XIU	17.81873	13.99594	0.004059	13.99594
2012/2/17	XIU	17.81873	14.4958	0.004204	14.4958
2012/2/17	XIU	17.81873	14.99565	0.004349	14.99565

2012/2/17	XIU	17.81873	15.49551	0.004494	15.49551
2012/2/17	XIU	17.81873	15.99536	0.004639	15.99536
2012/2/17	XIU	17.81873	16.49522	0.004784	16.49522
2012/2/17	XIU	17.81873	16.99507	0.004929	16.99507
2012/2/17	XIU	17.81873	17.49493	0.005074	17.49493
2012/2/17	XIU	17.81873	17.99478	0.005219	17.99478
2012/2/17	XIU	17.81873	18.49464	0.005364	18.49464
2012/2/17	XIU	17.81873	18.99449	0.005509	18.99449
2012/2/17	XIU	17.81873	19.49435	0.005654	19.49435
2012/2/17	XIU	17.81873	19.9942	0.005799	19.9942
2012/2/17	XIU	17.81873	20.49406	0.005944	20.49406
2012/2/17	XIU	17.81873	20.99391	0.006089	20.99391
2012/2/17	XIU	17.81873	21.49377	0.006234	21.49377
2012/2/17	XIU	17.81873	21.99362	0.006379	21.99362
2012/3/16	XIU	17.93872	9.9971	0.0029	9.9971
2012/3/16	XIU	17.93872	11.99652	0.003479	11.99652
2012/3/16	XIU	17.93872	12.99623	0.003769	12.99623
2012/3/16	XIU	17.93872	13.49609	0.003914	13.49609
2012/3/16	XIU	17.93872	13.99594	0.004059	13.99594
2012/3/16	XIU	17.93872	14.4958	0.004204	14.4958
2012/3/16	XIU	17.93872	14.99565	0.004349	14.99565
2012/3/16	XIU	17.93872	15.49551	0.004494	15.49551
2012/3/16	XIU	17.93872	15.99536	0.004639	15.99536
2012/3/16	XIU	17.93872	16.49522	0.004784	16.49522
2012/3/16	XIU	17.93872	16.99507	0.004929	16.99507
2012/3/16	XIU	17.93872	17.49493	0.005074	17.49493
2012/3/16	XIU	17.93872	17.99478	0.005219	17.99478
2012/3/16	XIU	17.93872	18.49464	0.005364	18.49464
2012/3/16	XIU	17.93872	18.99449	0.005509	18.99449
2012/3/16	XIU	17.93872	19.49435	0.005654	19.49435
2012/3/16	XIU	17.93872	19.9942	0.005799	19.9942
2012/3/16	XIU	17.93872	20.49406	0.005944	20.49406
2012/3/16	XIU	17.93872	20.99391	0.006089	20.99391
2012/3/16	XIU	17.93872	21.49377	0.006234	21.49377
2012/3/16	XIU	17.93872	21.99362	0.006379	21.99362
2012/3/16	XIU	17.93872	22.49348	0.006524	22.49348
2012/3/16	XIU	17.93872	22.99333	0.006669	22.99333
2012/4/20	XIU	17.38876	13.99543	0.004573	13.99543
2012/4/20	XIU	17.38876	14.49526	0.004736	14.49526
2012/4/20	XIU	17.38876	14.9951	0.004899	14.9951
2012/4/20	XIU	17.38876	15.49494	0.005063	15.49494
2012/4/20	XIU	17.38876	15.99477	0.005226	15.99477
2012/4/20	XIU	17.38876	16.49461	0.005389	16.49461
2012/4/20	XIU	17.38876	16.99445	0.005552	16.99445

2012/4/20	XIU	17.38876	17.49428	0.005716	17.49428
2012/4/20	XIU	17.38876	17.99412	0.005879	17.99412
2012/4/20	XIU	17.38876	18.49396	0.006042	18.49396
2012/4/20	XIU	17.38876	18.99379	0.006206	18.99379
2012/4/20	XIU	17.38876	19.49363	0.006369	19.49363
2012/4/20	XIU	17.38876	19.99347	0.006532	19.99347
2012/4/20	XIU	17.38876	20.4933	0.006696	20.4933
2012/4/20	XIU	17.38876	20.99314	0.006859	20.99314
2012/4/20	XIU	17.38876	21.49298	0.007022	21.49298
2012/4/20	XIU	17.38876	21.99281	0.007185	21.99281
2012/5/18	XIU	16.11885	13.99585	0.004153	13.99585
2012/5/18	XIU	16.11885	14.4957	0.004301	14.4957
2012/5/18	XIU	16.11885	14.99555	0.004449	14.99555
2012/5/18	XIU	16.11885	15.4954	0.004598	15.4954
2012/5/18	XIU	16.11885	15.99525	0.004746	15.99525
2012/5/18	XIU	16.11885	16.49511	0.004894	16.49511
2012/5/18	XIU	16.11885	16.99496	0.005043	16.99496
2012/5/18	XIU	16.11885	17.49481	0.005191	17.49481
2012/5/18	XIU	16.11885	17.99466	0.005339	17.99466
2012/5/18	XIU	16.11885	18.49451	0.005488	18.49451
2012/5/18	XIU	16.11885	18.99436	0.005636	18.99436
2012/5/18	XIU	16.11885	19.49422	0.005784	19.49422
2012/5/18	XIU	16.11885	19.99407	0.005932	19.99407
2012/5/18	XIU	16.11885	20.49392	0.006081	20.49392
2012/5/18	XIU	16.11885	20.99377	0.006229	20.99377
2012/5/18	XIU	16.11885	21.49362	0.006377	21.49362
2012/5/18	XIU	16.11885	21.99347	0.006526	21.99347
2012/5/18	XIU	16.11885	22.49333	0.006674	22.49333
2012/6/15	XIU	16.60881	12.99623	0.003769	12.99623
2012/6/15	XIU	16.60881	13.49609	0.003914	13.49609
2012/6/15	XIU	16.60881	13.99594	0.004059	13.99594
2012/6/15	XIU	16.60881	14.4958	0.004204	14.4958
2012/6/15	XIU	16.60881	14.99565	0.004349	14.99565
2012/6/15	XIU	16.60881	15.49551	0.004494	15.49551
2012/6/15	XIU	16.60881	15.99536	0.004639	15.99536
2012/6/15	XIU	16.60881	16.49522	0.004784	16.49522
2012/6/15	XIU	16.60881	16.99507	0.004929	16.99507
2012/6/15	XIU	16.60881	17.49493	0.005074	17.49493
2012/6/15	XIU	16.60881	17.99478	0.005219	17.99478
2012/6/15	XIU	16.60881	18.49464	0.005364	18.49464
2012/6/15	XIU	16.60881	18.99449	0.005509	18.99449
2012/6/15	XIU	16.60881	19.49435	0.005654	19.49435
2012/6/15	XIU	16.60881	19.9942	0.005799	19.9942
2012/6/15	XIU	16.60881	20.49406	0.005944	20.49406

2012/6/15	XIU	16.60881	20.99391	0.006089	20.99391
2012/6/15	XIU	16.60881	21.49377	0.006234	21.49377
2012/6/15	XIU	16.60881	21.99362	0.006379	21.99362
2011/10/21	XFN	21.49805	17.99484	0.005159	17.99484
2011/10/21	XFN	21.49805	18.99455	0.005446	18.99455
2011/10/21	XFN	21.49805	19.99427	0.005733	19.99427
2011/10/21	XFN	21.49805	20.99398	0.006019	20.99398
2011/10/21	XFN	21.49805	21.99369	0.006306	21.99369
2011/10/21	XFN	21.49805	22.99341	0.006592	22.99341
2011/10/21	XFN	21.49805	23.99312	0.006879	23.99312
2011/10/21	XFN	21.49805	24.99283	0.007166	24.99283
2011/10/21	XFN	21.49805	25.99255	0.007452	25.99255
2011/10/21	XFN	21.49805	26.99226	0.007739	26.99226
2011/10/21	XFN	21.49805	27.99197	0.008026	27.99197
2011/11/18	XFN	20.24816	17.99496	0.005039	17.99496
2011/11/18	XFN	20.24816	18.99468	0.005319	18.99468
2011/11/18	XFN	20.24816	19.9944	0.005599	19.9944
2011/11/18	XFN	20.24816	20.99412	0.005879	20.99412
2011/11/18	XFN	20.24816	21.99384	0.006159	21.99384
2011/11/18	XFN	20.24816	22.99356	0.006439	22.99356
2011/11/18	XFN	20.24816	23.99328	0.006719	23.99328
2011/11/18	XFN	20.24816	24.993	0.006999	24.993
2011/11/18	XFN	20.24816	25.99272	0.007279	25.99272
2011/12/16	XFN	20.51814	15.99589	0.004106	15.99589
2011/12/16	XFN	20.51814	16.99564	0.004363	16.99564
2011/12/16	XFN	20.51814	17.99538	0.004619	17.99538
2011/12/16	XFN	20.51814	18.99512	0.004876	18.99512
2011/12/16	XFN	20.51814	19.99487	0.005133	19.99487
2011/12/16	XFN	20.51814	20.99461	0.005389	20.99461
2011/12/16	XFN	20.51814	21.99435	0.005646	21.99435
2011/12/16	XFN	20.51814	22.9941	0.005903	22.9941
2011/12/16	XFN	20.51814	23.99384	0.006159	23.99384
2011/12/16	XFN	20.51814	24.99358	0.006416	24.99358
2011/12/16	XFN	20.51814	25.99333	0.006672	25.99333
2011/12/16	XFN	20.51814	26.99307	0.006929	26.99307
2011/12/16	XFN	20.51814	27.99281	0.007186	27.99281
2011/12/16	XFN	20.51814	28.99256	0.007442	28.99256
2011/12/16	XFN	20.51814	29.9923	0.007699	29.9923
2012/1/20	XFN	22.42797	15.99584	0.004159	15.99584
2012/1/20	XFN	22.42797	16.99558	0.004419	16.99558
2012/1/20	XFN	22.42797	17.99532	0.004679	17.99532
2012/1/20	XFN	22.42797	18.99506	0.004939	18.99506
2012/1/20	XFN	22.42797	19.9948	0.005199	19.9948
2012/1/20	XFN	22.42797	20.99454	0.005459	20.99454

2012/1/20	XFN	22.42797	21.99428	0.005719	21.99428
2012/1/20	XFN	22.42797	22.99402	0.005979	22.99402
2012/1/20	XFN	22.42797	23.99376	0.006239	23.99376
2012/1/20	XFN	22.42797	24.9935	0.006499	24.9935
2012/1/20	XFN	22.42797	25.99324	0.006759	25.99324
2012/2/17	XFN	22.27798	15.99536	0.004639	15.99536
2012/2/17	XFN	22.27798	16.99507	0.004929	16.99507
2012/2/17	XFN	22.27798	17.99478	0.005219	17.99478
2012/2/17	XFN	22.27798	18.99449	0.005509	18.99449
2012/2/17	XFN	22.27798	19.9942	0.005799	19.9942
2012/2/17	XFN	22.27798	20.99391	0.006089	20.99391
2012/2/17	XFN	22.27798	21.99362	0.006379	21.99362
2012/2/17	XFN	22.27798	22.99333	0.006669	22.99333
2012/2/17	XFN	22.27798	23.99304	0.006959	23.99304
2012/2/17	XFN	22.27798	24.99275	0.007249	24.99275
2012/2/17	XFN	22.27798	25.99246	0.007539	25.99246
2012/2/17	XFN	22.27798	26.99217	0.007829	26.99217
2012/2/17	XFN	22.27798	27.99188	0.008119	27.99188
2012/3/16	XFN	23.48787	15.99536	0.004639	15.99536
2012/3/16	XFN	23.48787	16.99507	0.004929	16.99507
2012/3/16	XFN	23.48787	17.99478	0.005219	17.99478
2012/3/16	XFN	23.48787	18.99449	0.005509	18.99449
2012/3/16	XFN	23.48787	19.9942	0.005799	19.9942
2012/3/16	XFN	23.48787	20.99391	0.006089	20.99391
2012/3/16	XFN	23.48787	21.99362	0.006379	21.99362
2012/3/16	XFN	23.48787	22.99333	0.006669	22.99333
2012/3/16	XFN	23.48787	23.99304	0.006959	23.99304
2012/3/16	XFN	23.48787	24.99275	0.007249	24.99275
2012/3/16	XFN	23.48787	25.99246	0.007539	25.99246
2012/3/16	XFN	23.48787	26.99217	0.007829	26.99217
2012/3/16	XFN	23.48787	27.99188	0.008119	27.99188
2012/3/16	XFN	23.48787	28.99159	0.008409	28.99159
2012/4/20	XFN	23.33788	17.99412	0.005879	17.99412
2012/4/20	XFN	23.33788	18.99379	0.006206	18.99379
2012/4/20	XFN	23.33788	19.99347	0.006532	19.99347
2012/4/20	XFN	23.33788	20.99314	0.006859	20.99314
2012/4/20	XFN	23.33788	21.99281	0.007185	21.99281
2012/4/20	XFN	23.33788	22.99249	0.007512	22.99249
2012/4/20	XFN	23.33788	23.99216	0.007839	23.99216
2012/4/20	XFN	23.33788	24.99183	0.008165	24.99183
2012/4/20	XFN	23.33788	25.99151	0.008492	25.99151
2012/4/20	XFN	23.33788	26.99118	0.008819	26.99118
2012/4/20	XFN	23.33788	27.99085	0.009145	27.99085
2012/4/20	XFN	23.33788	28.99053	0.009472	28.99053

2012/5/18	XFN	21.33806	17.99466	0.005339	17.99466
2012/5/18	XFN	21.33806	18.99436	0.005636	18.99436
2012/5/18	XFN	21.33806	19.99407	0.005932	19.99407
2012/5/18	XFN	21.33806	20.99377	0.006229	20.99377
2012/5/18	XFN	21.33806	21.99347	0.006526	21.99347
2012/5/18	XFN	21.33806	22.99318	0.006822	22.99318
2012/5/18	XFN	21.33806	23.99288	0.007119	23.99288
2012/5/18	XFN	21.33806	24.99258	0.007416	24.99258
2012/5/18	XFN	21.33806	25.99229	0.007712	25.99229
2012/5/18	XFN	21.33806	26.99199	0.008009	26.99199
2012/5/18	XFN	21.33806	27.99169	0.008305	27.99169
2012/5/18	XFN	21.33806	28.9914	0.008602	28.9914
2012/6/15	XFN	21.40806	14.4958	0.004204	14.4958
2012/6/15	XFN	21.40806	15.99536	0.004639	15.99536
2012/6/15	XFN	21.40806	16.99507	0.004929	16.99507
2012/6/15	XFN	21.40806	17.49493	0.005074	17.49493
2012/6/15	XFN	21.40806	17.99478	0.005219	17.99478
2012/6/15	XFN	21.40806	18.99449	0.005509	18.99449
2012/6/15	XFN	21.40806	19.9942	0.005799	19.9942
2012/6/15	XFN	21.40806	20.99391	0.006089	20.99391
2012/6/15	XFN	21.40806	21.99362	0.006379	21.99362
2012/6/15	XFN	21.40806	22.99333	0.006669	22.99333
2012/6/15	XFN	21.40806	23.99304	0.006959	23.99304
2012/6/15	XFN	21.40806	24.99275	0.007249	24.99275
2012/6/15	XFN	21.40806	25.99246	0.007539	25.99246
2012/6/15	XFN	21.40806	26.99217	0.007829	26.99217
2012/6/15	XFN	21.40806	27.99188	0.008119	27.99188
2012/6/15	XFN	21.40806	28.99159	0.008409	28.99159
2011/10/21	XEG	16.78902	10.99685	0.003153	10.99685
2011/10/21	XEG	16.78902	11.99656	0.00344	11.99656
2011/10/21	XEG	16.78902	12.99627	0.003726	12.99627
2011/10/21	XEG	16.78902	13.99599	0.004013	13.99599
2011/10/21	XEG	16.78902	14.9957	0.004299	14.9957
2011/10/21	XEG	16.78902	15.99541	0.004586	15.99541
2011/10/21	XEG	16.78902	16.99513	0.004873	16.99513
2011/10/21	XEG	16.78902	17.99484	0.005159	17.99484
2011/10/21	XEG	16.78902	18.99455	0.005446	18.99455
2011/10/21	XEG	16.78902	19.99427	0.005733	19.99427
2011/10/21	XEG	16.78902	20.99398	0.006019	20.99398
2011/10/21	XEG	16.78902	21.99369	0.006306	21.99369
2011/10/21	XEG	16.78902	22.99341	0.006592	22.99341
2011/10/21	XEG	16.78902	23.99312	0.006879	23.99312
2011/11/18	XEG	16.86902	10.99692	0.00308	10.99692
2011/11/18	XEG	16.86902	11.99664	0.00336	11.99664

2011/11/18	XEG	16.86902	12.99636	0.003639	12.99636
2011/11/18	XEG	16.86902	13.99608	0.003919	13.99608
2011/11/18	XEG	16.86902	14.49594	0.004059	14.49594
2011/11/18	XEG	16.86902	14.9958	0.004199	14.9958
2011/11/18	XEG	16.86902	15.99552	0.004479	15.99552
2011/11/18	XEG	16.86902	16.99524	0.004759	16.99524
2011/11/18	XEG	16.86902	17.99496	0.005039	17.99496
2011/11/18	XEG	16.86902	18.99468	0.005319	18.99468
2011/11/18	XEG	16.86902	19.9944	0.005599	19.9944
2011/11/18	XEG	16.86902	20.99412	0.005879	20.99412
2011/11/18	XEG	16.86902	21.99384	0.006159	21.99384
2011/12/16	XEG	16.25906	10.99718	0.002823	10.99718
2011/12/16	XEG	16.25906	11.99692	0.00308	11.99692
2011/12/16	XEG	16.25906	12.99666	0.003336	12.99666
2011/12/16	XEG	16.25906	13.99641	0.003593	13.99641
2011/12/16	XEG	16.25906	14.99615	0.00385	14.99615
2011/12/16	XEG	16.25906	15.99589	0.004106	15.99589
2011/12/16	XEG	16.25906	16.99564	0.004363	16.99564
2011/12/16	XEG	16.25906	17.99538	0.004619	17.99538
2011/12/16	XEG	16.25906	18.99512	0.004876	18.99512
2011/12/16	XEG	16.25906	19.99487	0.005133	19.99487
2011/12/16	XEG	16.25906	20.99461	0.005389	20.99461
2011/12/16	XEG	16.25906	21.99435	0.005646	21.99435
2011/12/16	XEG	16.25906	22.9941	0.005903	22.9941
2011/12/16	XEG	16.25906	23.99384	0.006159	23.99384
2011/12/16	XEG	16.25906	24.99358	0.006416	24.99358
2011/12/16	XEG	16.25906	25.99333	0.006672	25.99333
2012/1/20	XEG	17.34899	13.99636	0.00364	13.99636
2012/1/20	XEG	17.34899	14.9961	0.003899	14.9961
2012/1/20	XEG	17.34899	15.99584	0.004159	15.99584
2012/1/20	XEG	17.34899	16.99558	0.004419	16.99558
2012/1/20	XEG	17.34899	17.99532	0.004679	17.99532
2012/1/20	XEG	17.34899	18.99506	0.004939	18.99506
2012/1/20	XEG	17.34899	19.9948	0.005199	19.9948
2012/2/17	XEG	17.86896	13.99594	0.004059	13.99594
2012/2/17	XEG	17.86896	14.99565	0.004349	14.99565
2012/2/17	XEG	17.86896	15.99536	0.004639	15.99536
2012/2/17	XEG	17.86896	16.99507	0.004929	16.99507
2012/2/17	XEG	17.86896	17.99478	0.005219	17.99478
2012/2/17	XEG	17.86896	18.99449	0.005509	18.99449
2012/2/17	XEG	17.86896	19.9942	0.005799	19.9942
2012/3/16	XEG	17.31899	9.9971	0.0029	9.9971
2012/3/16	XEG	17.31899	10.99681	0.00319	10.99681
2012/3/16	XEG	17.31899	11.99652	0.003479	11.99652

2012/3/16	XEG	17.31899	12.99623	0.003769	12.99623
2012/3/16	XEG	17.31899	13.99594	0.004059	13.99594
2012/3/16	XEG	17.31899	14.99565	0.004349	14.99565
2012/3/16	XEG	17.31899	15.99536	0.004639	15.99536
2012/3/16	XEG	17.31899	16.99507	0.004929	16.99507
2012/3/16	XEG	17.31899	17.99478	0.005219	17.99478
2012/3/16	XEG	17.31899	18.99449	0.005509	18.99449
2012/3/16	XEG	17.31899	19.9942	0.005799	19.9942
2012/3/16	XEG	17.31899	20.99391	0.006089	20.99391
2012/3/16	XEG	17.31899	21.99362	0.006379	21.99362
2012/3/16	XEG	17.31899	22.99333	0.006669	22.99333
2012/3/16	XEG	17.31899	23.99304	0.006959	23.99304
2012/3/16	XEG	17.31899	24.99275	0.007249	24.99275
2012/4/20	XEG	15.75908	13.99543	0.004573	13.99543
2012/4/20	XEG	15.75908	14.9951	0.004899	14.9951
2012/4/20	XEG	15.75908	15.99477	0.005226	15.99477
2012/4/20	XEG	15.75908	16.99445	0.005552	16.99445
2012/4/20	XEG	15.75908	17.99412	0.005879	17.99412
2012/4/20	XEG	15.75908	18.99379	0.006206	18.99379
2012/4/20	XEG	15.75908	19.99347	0.006532	19.99347
2012/5/18	XEG	14.57915	12.99614	0.003856	12.99614
2012/5/18	XEG	14.57915	13.99585	0.004153	13.99585
2012/5/18	XEG	14.57915	14.99555	0.004449	14.99555
2012/5/18	XEG	14.57915	15.99525	0.004746	15.99525
2012/5/18	XEG	14.57915	16.99496	0.005043	16.99496
2012/5/18	XEG	14.57915	17.99466	0.005339	17.99466
2012/5/18	XEG	14.57915	18.99436	0.005636	18.99436
2012/5/18	XEG	14.57915	19.99407	0.005932	19.99407
2012/6/15	XEG	14.81914	10.99681	0.00319	10.99681
2012/6/15	XEG	14.81914	11.99652	0.003479	11.99652
2012/6/15	XEG	14.81914	12.99623	0.003769	12.99623
2012/6/15	XEG	14.81914	13.99594	0.004059	13.99594
2012/6/15	XEG	14.81914	14.4958	0.004204	14.4958
2012/6/15	XEG	14.81914	14.99565	0.004349	14.99565
2012/6/15	XEG	14.81914	15.99536	0.004639	15.99536
2012/6/15	XEG	14.81914	16.99507	0.004929	16.99507
2012/6/15	XEG	14.81914	17.99478	0.005219	17.99478
2012/6/15	XEG	14.81914	18.99449	0.005509	18.99449
2012/6/15	XEG	14.81914	19.9942	0.005799	19.9942
2011/10/21	XGD	23.21958	17.99484	0.005159	17.99484
2011/10/21	XGD	23.21958	18.99455	0.005446	18.99455
2011/10/21	XGD	23.21958	19.99427	0.005733	19.99427
2011/10/21	XGD	23.21958	20.99398	0.006019	20.99398
2011/10/21	XGD	23.21958	21.99369	0.006306	21.99369

2011/10/21	XGD	23.21958	22.99341	0.006592	22.99341
2011/10/21	XGD	23.21958	23.99312	0.006879	23.99312
2011/10/21	XGD	23.21958	24.99283	0.007166	24.99283
2011/10/21	XGD	23.21958	25.99255	0.007452	25.99255
2011/10/21	XGD	23.21958	26.99226	0.007739	26.99226
2011/10/21	XGD	23.21958	27.99197	0.008026	27.99197
2011/10/21	XGD	23.21958	28.99169	0.008312	28.99169
2011/10/21	XGD	23.21958	29.9914	0.008599	29.9914
2011/10/21	XGD	23.21958	31.99083	0.009172	31.99083
2011/10/21	XGD	23.21958	33.99025	0.009745	33.99025
2011/11/18	XGD	25.04955	17.99496	0.005039	17.99496
2011/11/18	XGD	25.04955	18.99468	0.005319	18.99468
2011/11/18	XGD	25.04955	19.9944	0.005599	19.9944
2011/11/18	XGD	25.04955	20.99412	0.005879	20.99412
2011/11/18	XGD	25.04955	21.99384	0.006159	21.99384
2011/11/18	XGD	25.04955	22.99356	0.006439	22.99356
2011/11/18	XGD	25.04955	23.99328	0.006719	23.99328
2011/11/18	XGD	25.04955	24.993	0.006999	24.993
2011/11/18	XGD	25.04955	25.99272	0.007279	25.99272
2011/11/18	XGD	25.04955	26.99244	0.007559	26.99244
2011/11/18	XGD	25.04955	27.99216	0.007839	27.99216
2011/11/18	XGD	25.04955	28.99188	0.008119	28.99188
2011/11/18	XGD	25.04955	29.9916	0.008399	29.9916
2011/11/18	XGD	25.04955	31.99104	0.008959	31.99104
2011/11/18	XGD	25.04955	33.99048	0.009519	33.99048
2011/12/16	XGD	23.11958	17.99538	0.004619	17.99538
2011/12/16	XGD	23.11958	18.99512	0.004876	18.99512
2011/12/16	XGD	23.11958	19.99487	0.005133	19.99487
2011/12/16	XGD	23.11958	20.99461	0.005389	20.99461
2011/12/16	XGD	23.11958	21.99435	0.005646	21.99435
2011/12/16	XGD	23.11958	22.9941	0.005903	22.9941
2011/12/16	XGD	23.11958	23.99384	0.006159	23.99384
2011/12/16	XGD	23.11958	24.99358	0.006416	24.99358
2011/12/16	XGD	23.11958	25.99333	0.006672	25.99333
2011/12/16	XGD	23.11958	26.99307	0.006929	26.99307
2011/12/16	XGD	23.11958	27.99281	0.007186	27.99281
2011/12/16	XGD	23.11958	28.99256	0.007442	28.99256
2011/12/16	XGD	23.11958	29.9923	0.007699	29.9923
2011/12/16	XGD	23.11958	31.99179	0.008212	31.99179
2011/12/16	XGD	23.11958	33.99127	0.008726	33.99127
2012/1/20	XGD	22.75959	17.99532	0.004679	17.99532
2012/1/20	XGD	22.75959	18.99506	0.004939	18.99506
2012/1/20	XGD	22.75959	19.9948	0.005199	19.9948
2012/1/20	XGD	22.75959	20.99454	0.005459	20.99454

2012/1/20	XGD	22.75959	21.99428	0.005719	21.99428
2012/1/20	XGD	22.75959	22.99402	0.005979	22.99402
2012/1/20	XGD	22.75959	23.99376	0.006239	23.99376
2012/1/20	XGD	22.75959	24.9935	0.006499	24.9935
2012/1/20	XGD	22.75959	25.99324	0.006759	25.99324
2012/1/20	XGD	22.75959	26.99298	0.007019	26.99298
2012/1/20	XGD	22.75959	27.99272	0.007279	27.99272
2012/1/20	XGD	22.75959	28.99246	0.007539	28.99246
2012/1/20	XGD	22.75959	29.9922	0.007799	29.9922
2012/1/20	XGD	22.75959	31.99168	0.008319	31.99168
2012/2/17	XGD	23.04958	17.99478	0.005219	17.99478
2012/2/17	XGD	23.04958	18.99449	0.005509	18.99449
2012/2/17	XGD	23.04958	19.9942	0.005799	19.9942
2012/2/17	XGD	23.04958	20.99391	0.006089	20.99391
2012/2/17	XGD	23.04958	21.99362	0.006379	21.99362
2012/2/17	XGD	23.04958	22.99333	0.006669	22.99333
2012/2/17	XGD	23.04958	23.99304	0.006959	23.99304
2012/2/17	XGD	23.04958	24.99275	0.007249	24.99275
2012/2/17	XGD	23.04958	25.99246	0.007539	25.99246
2012/2/17	XGD	23.04958	26.99217	0.007829	26.99217
2012/2/17	XGD	23.04958	27.99188	0.008119	27.99188
2012/2/17	XGD	23.04958	28.99159	0.008409	28.99159
2012/2/17	XGD	23.04958	29.9913	0.008699	29.9913
2012/3/16	XGD	21.13962	13.99594	0.004059	13.99594
2012/3/16	XGD	21.13962	15.99536	0.004639	15.99536
2012/3/16	XGD	21.13962	17.99478	0.005219	17.99478
2012/3/16	XGD	21.13962	18.99449	0.005509	18.99449
2012/3/16	XGD	21.13962	19.9942	0.005799	19.9942
2012/3/16	XGD	21.13962	20.99391	0.006089	20.99391
2012/3/16	XGD	21.13962	21.99362	0.006379	21.99362
2012/3/16	XGD	21.13962	22.99333	0.006669	22.99333
2012/3/16	XGD	21.13962	23.99304	0.006959	23.99304
2012/3/16	XGD	21.13962	24.99275	0.007249	24.99275
2012/3/16	XGD	21.13962	25.99246	0.007539	25.99246
2012/3/16	XGD	21.13962	26.99217	0.007829	26.99217
2012/3/16	XGD	21.13962	27.99188	0.008119	27.99188
2012/3/16	XGD	21.13962	28.99159	0.008409	28.99159
2012/3/16	XGD	21.13962	29.9913	0.008699	29.9913
2012/3/16	XGD	21.13962	31.99072	0.009279	31.99072
2012/3/16	XGD	21.13962	33.99014	0.009859	33.99014
2012/4/20	XGD	19.39965	17.99412	0.005879	17.99412
2012/4/20	XGD	19.39965	18.99379	0.006206	18.99379
2012/4/20	XGD	19.39965	19.99347	0.006532	19.99347
2012/4/20	XGD	19.39965	20.99314	0.006859	20.99314

2012/4/20	XGD	19.39965	21.99281	0.007185	21.99281
2012/4/20	XGD	19.39965	22.99249	0.007512	22.99249
2012/4/20	XGD	19.39965	23.99216	0.007839	23.99216
2012/4/20	XGD	19.39965	24.99183	0.008165	24.99183
2012/4/20	XGD	19.39965	25.99151	0.008492	25.99151
2012/4/20	XGD	19.39965	26.99118	0.008819	26.99118
2012/5/18	XGD	17.89968	15.99525	0.004746	15.99525
2012/5/18	XGD	17.89968	16.99496	0.005043	16.99496
2012/5/18	XGD	17.89968	17.99466	0.005339	17.99466
2012/5/18	XGD	17.89968	18.99436	0.005636	18.99436
2012/5/18	XGD	17.89968	19.99407	0.005932	19.99407
2012/5/18	XGD	17.89968	20.99377	0.006229	20.99377
2012/5/18	XGD	17.89968	21.99347	0.006526	21.99347
2012/5/18	XGD	17.89968	22.99318	0.006822	22.99318
2012/5/18	XGD	17.89968	23.99288	0.007119	23.99288
2012/5/18	XGD	17.89968	24.99258	0.007416	24.99258
2012/5/18	XGD	17.89968	25.99229	0.007712	25.99229
2012/6/15	XGD	20.09964	14.99565	0.004349	14.99565
2012/6/15	XGD	20.09964	15.99536	0.004639	15.99536
2012/6/15	XGD	20.09964	16.99507	0.004929	16.99507
2012/6/15	XGD	20.09964	17.99478	0.005219	17.99478
2012/6/15	XGD	20.09964	18.99449	0.005509	18.99449
2012/6/15	XGD	20.09964	19.9942	0.005799	19.9942
2012/6/15	XGD	20.09964	20.99391	0.006089	20.99391
2012/6/15	XGD	20.09964	21.99362	0.006379	21.99362
2012/6/15	XGD	20.09964	22.99333	0.006669	22.99333
2012/6/15	XGD	20.09964	23.99304	0.006959	23.99304
2012/6/15	XGD	20.09964	24.99275	0.007249	24.99275
2012/6/15	XGD	20.09964	25.99246	0.007539	25.99246
2012/6/15	XGD	20.09964	26.99217	0.007829	26.99217
2012/6/15	XGD	20.09964	27.99188	0.008119	27.99188
2012/6/15	XGD	20.09964	28.99159	0.008409	28.99159
2012/6/15	XGD	20.09964	29.9913	0.008699	29.9913
2012/6/15	XGD	20.09964	31.99072	0.009279	31.99072
2012/6/15	XGD	20.09964	33.99014	0.009859	33.99014
2011/10/21	GAS	22.16	21.99369	0.006306	21.99369
2011/10/21	GAS	22.16	22.99341	0.006592	22.99341
2011/10/21	GAS	22.16	23.99312	0.006879	23.99312
2011/10/21	GAS	22.16	24.99283	0.007166	24.99283
2011/10/21	GAS	22.16	25.99255	0.007452	25.99255
2011/10/21	GAS	22.16	26.99226	0.007739	26.99226
2011/10/21	GAS	22.16	27.99197	0.008026	27.99197
2011/11/18	GAS	20.49	19.9944	0.005599	19.9944
2011/11/18	GAS	20.49	20.99412	0.005879	20.99412

2011/11/18	GAS	20.49	21.99384	0.006159	21.99384
2011/11/18	GAS	20.49	22.99356	0.006439	22.99356
2011/11/18	GAS	20.49	23.99328	0.006719	23.99328
2011/11/18	GAS	20.49	24.993	0.006999	24.993
2011/11/18	GAS	20.49	25.99272	0.007279	25.99272
2011/12/16	GAS	18.44	18.99512	0.004876	18.99512
2011/12/16	GAS	18.44	19.99487	0.005133	19.99487
2011/12/16	GAS	18.44	20.99461	0.005389	20.99461
2011/12/16	GAS	18.44	21.99435	0.005646	21.99435
2011/12/16	GAS	18.44	22.9941	0.005903	22.9941
2011/12/16	GAS	18.44	23.99384	0.006159	23.99384
2011/12/16	GAS	18.44	24.99358	0.006416	24.99358
2011/12/16	GAS	18.44	25.99333	0.006672	25.99333
2011/12/16	GAS	18.44	26.99307	0.006929	26.99307
2011/12/16	GAS	18.44	27.99281	0.007186	27.99281
2011/12/16	GAS	18.44	28.99256	0.007442	28.99256
2011/12/16	GAS	18.44	29.9923	0.007699	29.9923
2011/12/16	GAS	18.44	31.99179	0.008212	31.99179
2011/12/16	GAS	18.44	33.99127	0.008726	33.99127
2012/1/20	GAS	13.6	14.9961	0.003899	14.9961
2012/1/20	GAS	13.6	15.99584	0.004159	15.99584
2012/1/20	GAS	13.6	16.99558	0.004419	16.99558
2012/1/20	GAS	13.6	17.99532	0.004679	17.99532
2012/1/20	GAS	13.6	18.99506	0.004939	18.99506
2012/1/20	GAS	13.6	19.9948	0.005199	19.9948
2012/1/20	GAS	13.6	20.99454	0.005459	20.99454
2012/1/20	GAS	13.6	21.99428	0.005719	21.99428
2012/1/20	GAS	13.6	22.99402	0.005979	22.99402
2012/1/20	GAS	13.6	23.99376	0.006239	23.99376
2012/2/17	GAS	13.07	10.99681	0.00319	10.99681
2012/2/17	GAS	13.07	11.99652	0.003479	11.99652
2012/2/17	GAS	13.07	12.99623	0.003769	12.99623
2012/2/17	GAS	13.07	13.99594	0.004059	13.99594
2012/2/17	GAS	13.07	14.99565	0.004349	14.99565
2012/2/17	GAS	13.07	15.99536	0.004639	15.99536
2012/2/17	GAS	13.07	16.99507	0.004929	16.99507
2012/2/17	GAS	13.07	17.99478	0.005219	17.99478
2012/2/17	GAS	13.07	18.99449	0.005509	18.99449
2012/2/17	GAS	13.07	19.9942	0.005799	19.9942
2012/2/17	GAS	13.07	20.99391	0.006089	20.99391
2012/2/17	GAS	13.07	21.99362	0.006379	21.99362
2012/2/17	GAS	13.07	22.99333	0.006669	22.99333
2012/3/16	GAS	11.04	8.99739	0.00261	8.99739
2012/3/16	GAS	11.04	9.9971	0.0029	9.9971

2012/3/16	GAS	11.04	10.99681	0.00319	10.99681
2012/3/16	GAS	11.04	11.99652	0.003479	11.99652
2012/3/16	GAS	11.04	12.99623	0.003769	12.99623
2012/3/16	GAS	11.04	13.99594	0.004059	13.99594
2012/3/16	GAS	11.04	14.99565	0.004349	14.99565
2012/3/16	GAS	11.04	15.99536	0.004639	15.99536
2012/3/16	GAS	11.04	16.99507	0.004929	16.99507
2012/3/16	GAS	11.04	17.99478	0.005219	17.99478
2012/3/16	GAS	11.04	18.99449	0.005509	18.99449
2012/3/16	GAS	11.04	19.9942	0.005799	19.9942
2012/3/16	GAS	11.04	20.99391	0.006089	20.99391
2012/3/16	GAS	11.04	21.99362	0.006379	21.99362
2012/3/16	GAS	11.04	22.99333	0.006669	22.99333
2012/3/16	GAS	11.04	23.99304	0.006959	23.99304
2012/3/16	GAS	11.04	24.99275	0.007249	24.99275
2012/3/16	GAS	11.04	25.99246	0.007539	25.99246
2012/3/16	GAS	11.04	26.99217	0.007829	26.99217
2012/3/16	GAS	11.04	27.99188	0.008119	27.99188
2012/3/16	GAS	11.04	28.99159	0.008409	28.99159
2012/3/16	GAS	11.04	29.9913	0.008699	29.9913
2012/3/16	GAS	11.04	31.99072	0.009279	31.99072
2012/3/16	GAS	11.04	33.99014	0.009859	33.99014
2012/4/20	GAS	8.6	7.997387	0.002613	7.997387
2012/4/20	GAS	8.6	8.99706	0.00294	8.99706
2012/4/20	GAS	8.6	9.996734	0.003266	9.996734
2012/4/20	GAS	8.6	10.99641	0.003593	10.99641
2012/4/20	GAS	8.6	11.99608	0.003919	11.99608
2012/4/20	GAS	8.6	12.99575	0.004246	12.99575
2012/4/20	GAS	8.6	13.99543	0.004573	13.99543
2012/4/20	GAS	8.6	14.9951	0.004899	14.9951
2012/4/20	GAS	8.6	15.99477	0.005226	15.99477
2012/4/20	GAS	8.6	16.99445	0.005552	16.99445
2012/5/18	GAS	12.31	6.997924	0.002076	6.997924
2012/5/18	GAS	12.31	7.997627	0.002373	7.997627
2012/5/18	GAS	12.31	8.99733	0.00267	8.99733
2012/5/18	GAS	12.31	9.997034	0.002966	9.997034
2012/5/18	GAS	12.31	10.99674	0.003263	10.99674
2012/5/18	GAS	12.31	11.99644	0.003559	11.99644
2012/5/18	GAS	12.31	12.99614	0.003856	12.99614
2012/5/18	GAS	12.31	13.99585	0.004153	13.99585
2012/5/18	GAS	12.31	14.99555	0.004449	14.99555
2012/6/15	GAS	10.06	6.99797	0.00203	6.99797
2012/6/15	GAS	10.06	7.99768	0.00232	7.99768
2012/6/15	GAS	10.06	8.99739	0.00261	8.99739

2012/6/15	GAS	10.06	9.9971	0.0029	9.9971
2012/6/15	GAS	10.06	10.99681	0.00319	10.99681
2012/6/15	GAS	10.06	11.99652	0.003479	11.99652
2012/6/15	GAS	10.06	12.99623	0.003769	12.99623
2012/6/15	GAS	10.06	13.99594	0.004059	13.99594
2012/6/15	GAS	10.06	14.99565	0.004349	14.99565
2012/6/15	GAS	10.06	15.99536	0.004639	15.99536
2012/6/15	GAS	10.06	16.99507	0.004929	16.99507
2012/6/15	GAS	10.06	17.99478	0.005219	17.99478
2012/6/15	GAS	10.06	18.99449	0.005509	18.99449
2012/6/15	GAS	10.06	19.9942	0.005799	19.9942
2012/6/15	GAS	10.06	20.99391	0.006089	20.99391
2012/6/15	GAS	10.06	21.99362	0.006379	21.99362
2012/6/15	GAS	10.06	22.99333	0.006669	22.99333
2012/6/15	GAS	10.06	23.99304	0.006959	23.99304
2012/6/15	GAS	10.06	24.99275	0.007249	24.99275
2012/6/15	GAS	10.06	25.99246	0.007539	25.99246
2012/6/15	GAS	10.06	26.99217	0.007829	26.99217