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Currency Project

Japanese Yen

Over the past couple months, the Japanese yen has steadily appreciated against the U.S. dollar. There are many reasons for this, including the current housing crisis in the U.S, steady Japanese interest rates compared to the falling U.S. interest rates, and a good year of exports for Japan in 2007.

Most of the movement that I have observed in the yen's valuation since December 2007 has been caused by events in the U.S. not Japan. In the recent months before December, the housing crisis in the U.S has been weakening the dollar against all major world currencies. The yen, not being an exception, quickly appreciated against the dollar in the last half of December. In January 2008, the affect of the U.S. housing crisis started to be felt in the markets of other countries, and particularly in Asia it caused the markets to fall. This caused the appreciation of the yen to slow and eventually level out through the end of January and beginning of February. Another factor of the recent appreciation of the yen is that the Bank of Japan has decided to keep its' interest rate the very low current rate of 0.5%, while the U.S. Federal Bank has drastically cut its' interest rate from 5.25% to 3.0% in four months. (MSN money) As the U.S. interest rate dropped it caused the yen to appreciate further, which is actually a bad thing for Japan because its' economy is largely based on the export of goods to other Asian countries and the U.S. The fear of weaker Japanese exports also caused their stock market to fall further.

Overall, the yen has appreciated by 5.36% in the time between December 17th and February 5th. The graph A.1 shows the data points and linear regression trend lines for the spot, forward, and future exchange rates. The forward and future rates also appreciated by 4.94% and 4.20% respectively. The forward rate appreciated by less because it was calculated using the 3 month LIBOR rates of both Japan and the U.S. While Japan's LIBOR rate stayed fairly consistent, the U.S. LIBOR rate dropped 56%, which caused the forward rate calculation of yen to appreciate slower. The future rate is more of

an educated guess as to where the yen would be in 90 days, so obviously the investors that were trading in yen futures thought that the yen forward price was an overvalued estimate of the spot rate in 90 days. If the spot rate for March 17th is the same as the spot rate for February 5th, ¥107.02/$, then anyone who bought a short position future contract for ¥111.8193 on December 17th is going to loose money and anyone who bought a long position contract will make money. For example, if you bought a future contract for ¥100,000, then the short position would loose ($40) and the long position would gain $40.

Japan's economy is mainly based on the exporting of goods to other countries. Trade with other Asian countries accounts for about 50% of their current account, trade with North America is the next largest segment at about 25%, followed by Europe and other countries. This means that their trade balance and current account are generally positive and steadily growing, as the table A.2 and graph A.3 show. Japan's current account balance has grown about 11% per year since 2001, with 2005 being the only year with negative growth, and in total their current account has grown by 86% since 2001. These results should show a fairly strong export-based economy, which allows them to back up any change in value of the yen against foreign currencies. Unfortunately, because Japan is an export-base economy, the recent trend of appreciation of the yen is bad for the Japanese economy because it makes their exported goods less competitive when compared to other countries or locally produced goods. The capital/financial account usually has a deficit for Japan, which follows the books theory that this account is normally a deficit if there is a credit on the current account. The main source of cash outflow from Japan is in foreign direct investment and portfolio investment in other countries. Japan mainly holds foreign direct investments in the Asian, mainly China, Western Europe, and North America in that order. (Ministry of Finance Japan p.93) The main industries for Japan's FDI are in the manufacturing segment (automobiles and other machinery) and, to a lesser degree, the retail and finance segments. (Ibid p.94) There isn't a whole lot of direct investment in Japan, in fact there was a negative balance of direct investment in Japan in 2006, most likely because of the yen's generally high value in the last 5 years, except for a slump in 2006 through the beginning of 2007. (Google Finance)

The interest rates in Japan have traditionally been very low and stable. Since December the interest rate in Japan has stayed at its current rate of 0.5%, but the interest rate in the U.S. has dropped from 4.75% to 3%. This means, because of the international fisher effect, that it could be less risky to invest in longer-term yen bonds because at 4.75% interest, an investor would have to expect the yen to appreciate by greater than 4.25% over the maturity of the bond, but at 3%, the yen only needs to appreciate by greater than 2.75% to make a profit. If you happened to invest in a yen bond over the couple months that I've been watching the yen, your bond would have had a 2.61% bonus, since the yen appreciated by 5.36%. The forward rate also takes into account the changes in both countries interest rates, using the interest rate parity theory. The effect of the U.S. interest rates change on the forward rate is that the forward rate appreciated by 4.9% with an average premium of 3.05%, which means that it will take, on average, 3.05% more dollars to buy one yen using the forward rate. The future rates generally have a lower premium which make them more attractive to companies that are trying to effectively hedge transactions. Both of these rates can be seen in graph A.1 and the premiums can be found in graph A.4. If markets were completely efficient, then these examples would have predicted the 90 day future spot exchange rate, but if the yen stays where it is currently and you bought a forward contract to go from dollars to yen at the December 17th rate, you would save money compared to if you left the transaction uncovered. The opposite is also true if you were going from yen to dollars, it would be better to uncovered than locked in at the depreciated forward rate.

Japan is a relatively stable environment for investors, it doesn't have many political risks or controls on capital ownership or liquidity and the country has a well developed infrastructure. Japan's main problems are that they sometimes get caught up in a contagion situation when other Asian countries have problems and fears that Japan will soon go into a recession because of their weak GDP growth.(Trading Economics) If Japan does go into a recession, it will probably cause the yen to depreciate again, which will increase their exports, which will, in turn, boost their economy in the long run. So a recession is not such a bad thing for Japan at this time.

The exchange rate determination model attempts to use the three previously discussed indicators, balance of payments, parity conditions, and asset markets, to determine the spot exchange rate at a future date. I will try and combine that model with the short-term data trends that I've collected to try and predict the future spot rates in the short term (90 days) and a longer term (1 year). If you start in the asset approach, Japan doesn't have that strong of an outlook for economic growth. Their GDP has been almost stationary around the same range since 1994 (Ministry of Finance Japan p.19) and the yen has been appreciating mostly because of the dollars depreciation. One of the main things that is helping the Japanese economy is their positive current account balance, but if their economy stagnates and the yen appreciates, their exported goods will no longer be bought by the main countries that import their goods (China and the U.S). This will then cause their current account balance to drop, possibly until it becomes negative even though a slowing in exports will most likely cause a slowing in their imports of crude materials, which will force their economy into a recession. Trying to guess a 90 day future spot rate is pretty much a “random walk”, but I think the yen will continue to slowly appreciate or level off for the next month, but after that it will probably depreciate back to a ¥112/$ level, which is where it was around December 17th through the 31st. The other reason that I think this will happen is because there has been pressure on the Bank of Japan to lower interest rates to try and stop the yen from appreciating any higher.(Forbes) If the interest rates drop in Japan, then it will make investments and savings in yen less attractive to investors. ¥112/$ is also fairly close to the 90 day forward rate of ¥107/$. To predict the long-term spot rate, 1 year from now, you would have to guess that the “noise” of the short-term path would point toward an overall trend for the currency. Generally the long-term trend would be to have the yen slowly and stably appreciate, but I think with the U.S. housing crisis not yet over and the not-so-good outlook on the Japanese economy on the horizon, I'm going to guess that the long-term trend will depreciate the yen. Over the next year, I predict that the yen will depreciate to ¥118/$. This guess is probably pretty conservative and depends mostly on how fast the U.S. recovers (or not) from its' current crisis, if the U.S. recovers quickly then I would depreciate the yen further, if it

takes longer to recover then my estimate will probably be close.

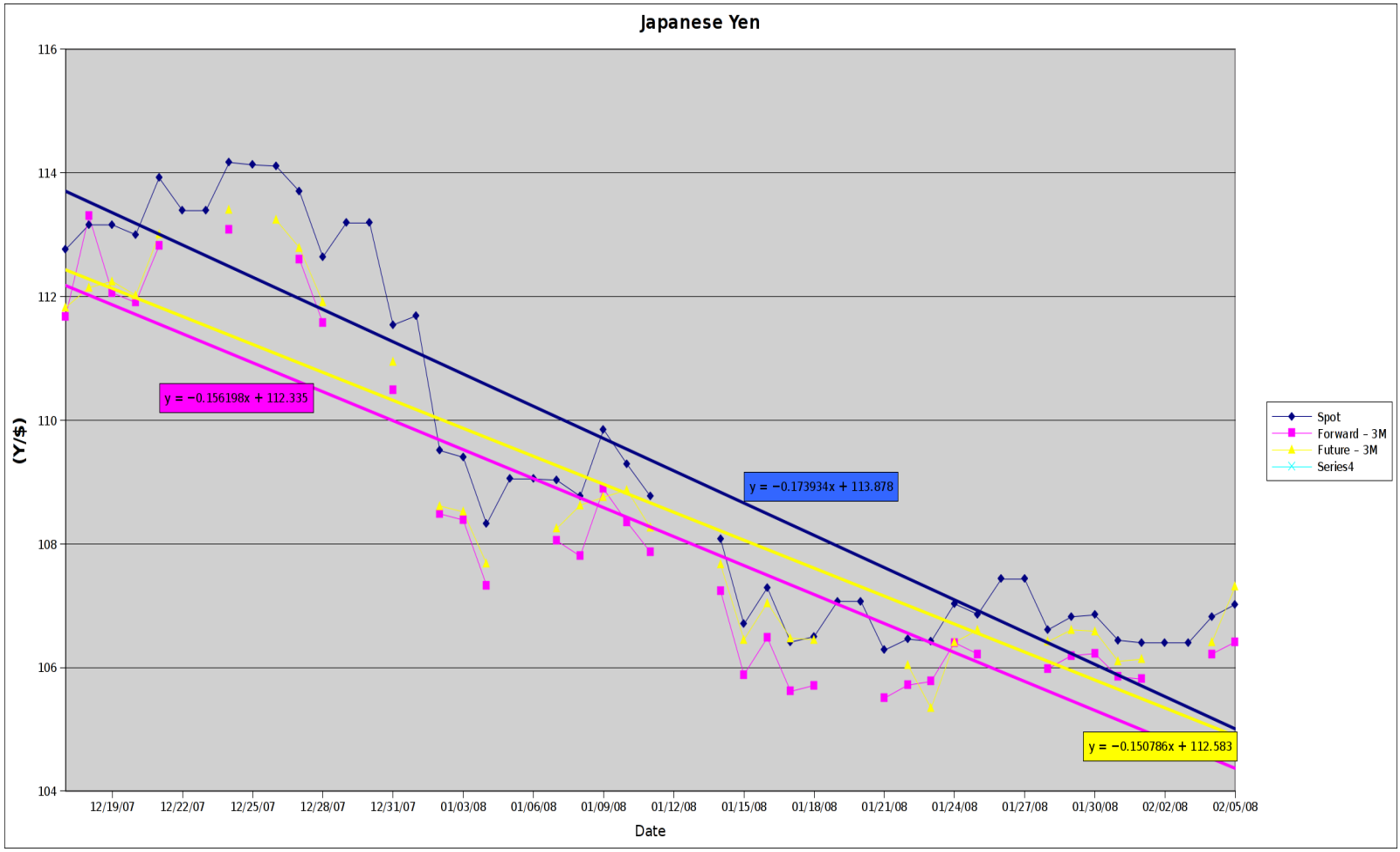
In order to use my estimation, I decided to pretend to be currency speculator and check to see, from both the Japanese and U.S. perspectives, if there was any arbitrage potential. From the U.S. perspective, I started out with $1,000,000 and checked to see, using the current spot, LIBOR, forward, and estimated future spot rates, if I could convert to the yen for 90 days and then convert back to dollars and make a profit. It turns out that because my short-term estimation shows the yen depreciating, you would loose money trying to do this and the forward rate is also going to cause you to loose money. However, if you try it from the Japanese perspective, with ¥1,000,000, and choose whether or not to convert yen to dollars for 90 days or just leaving your money in yen, you can make quite a bit of money, with both the covered and uncovered methods. (See table A.5 for results) Using my long-term estimates, with the same starting money, it is much better to cover your investment because you would make $0.31 from the U.S. perspective, but with the Japanese perspective you wouldn't gain anything by covering, but you could make money by leaving your investment uncovered. (See table A.6 for results) If you were running a Japanese company, believed my estimates, and wanted to hedge against the depreciation of the yen because of having to pay a U.S. company in 90 days, then you should probably buy a forward contract or call options to hedge the transaction because if the yen does depreciate you will be able to pay the U.S. company at an appreciated yen to dollar rate. On the other hand, if you are running a U.S. company and are looking to hedge a future transaction, then you could leave the transaction uncovered, buy forward or future contracts (as long as their not higher than my estimates), or buy put options, which would allow you to only lose a premium if the yen appreciated or didn't depreciate to the break-even price and if I was right, then you would have to pay less to the Japanese company.

Based on my collected data and by applying theories in the book, I have predicted the 90-day spot rate for the Yen to be ¥112/$ and the 1-year spot rate to be ¥118/$. I believe that my reasoning for these rates is fairly sound, if not a little conservative, and I will be very interested to see on May 5th

2008 and February 5th 2009 how close my estimates actually were.

Appendix

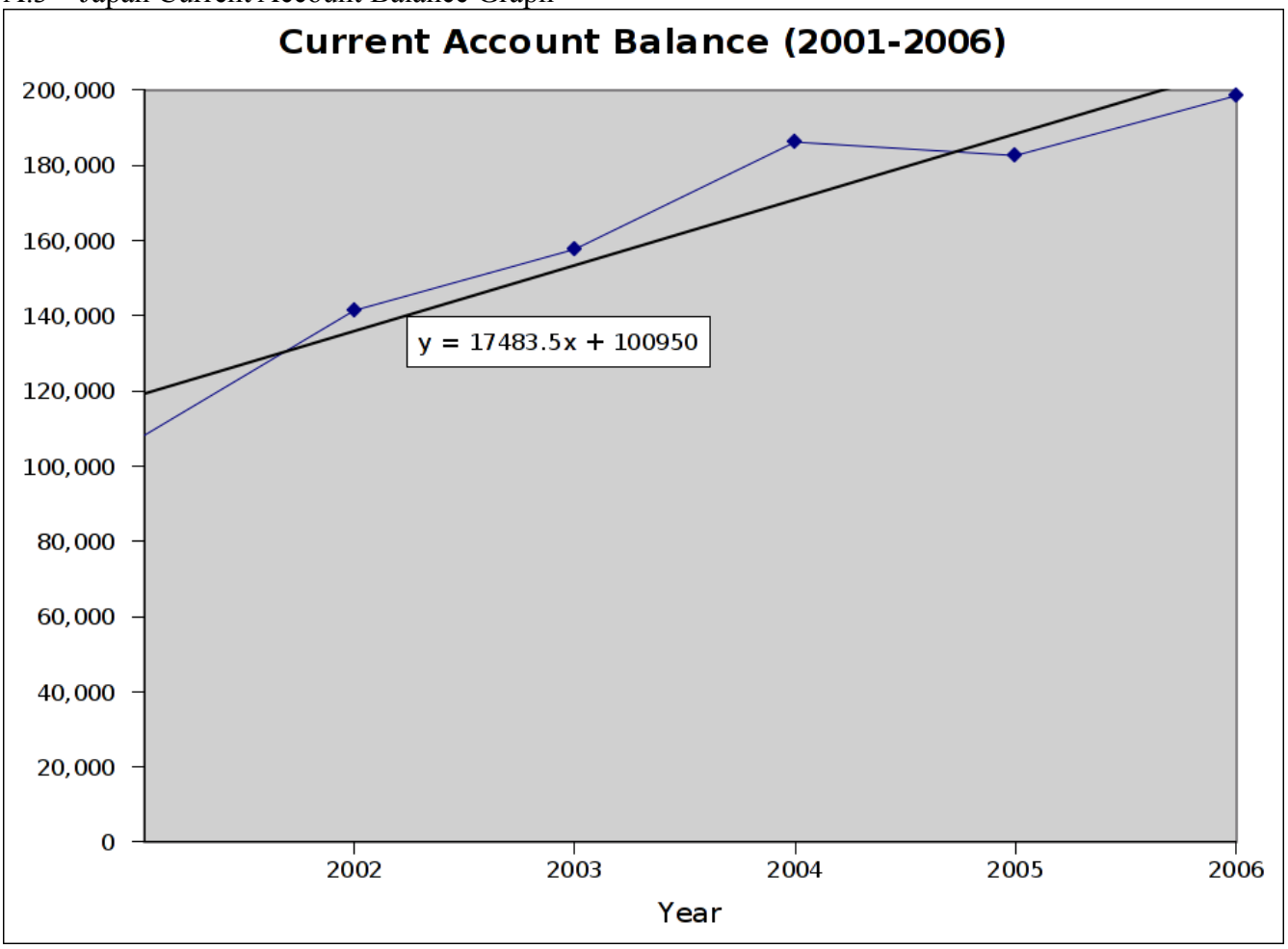
A.1 – Spot (Blue), forward(Pink), and future(Yellow) price trends. Can also be viewed in the excel document under the Trend Graphs tab.



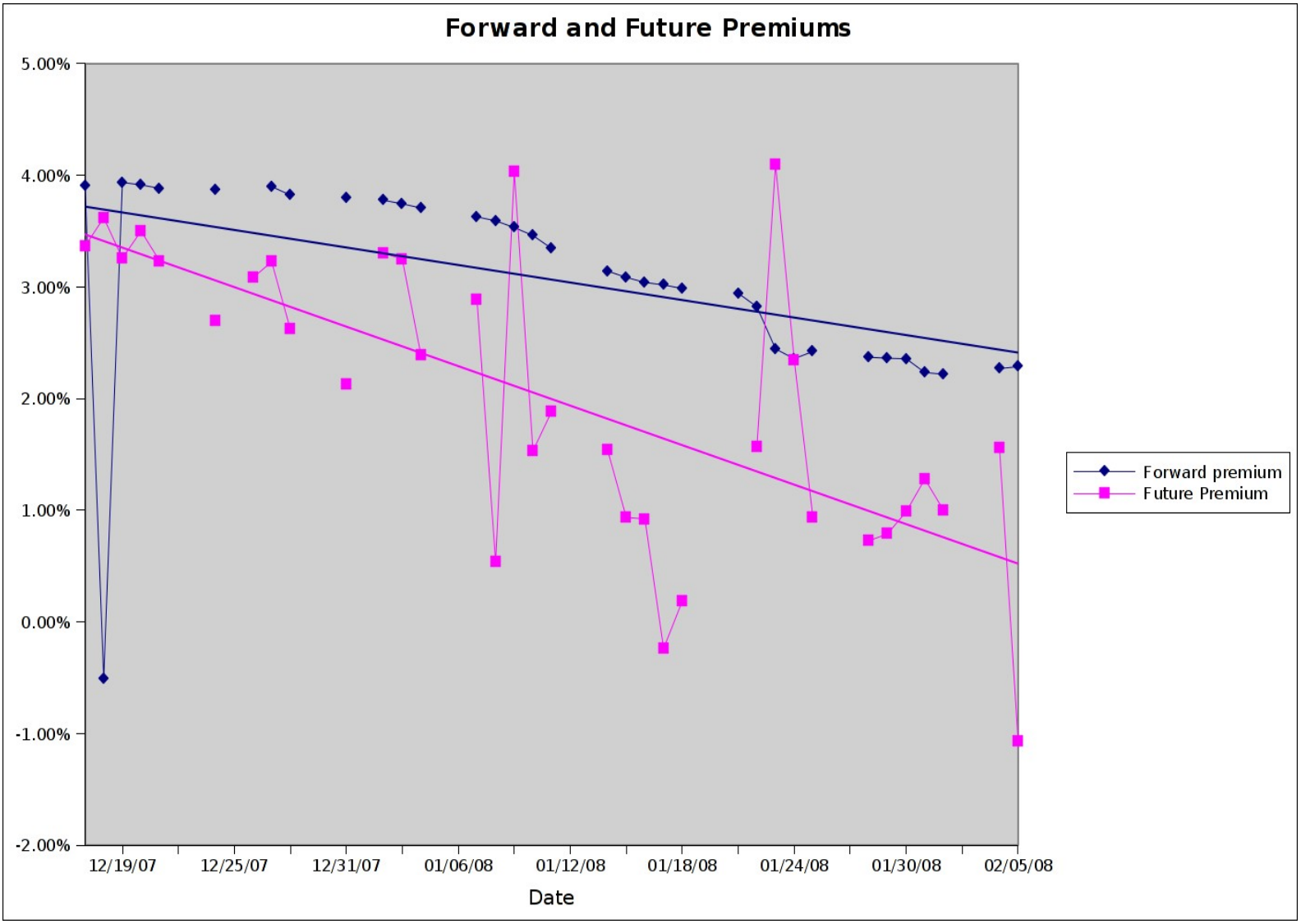
A.2 – Japan Current Account Balance

Year	Current Account	Change/Year
2001	106,523	
2002	141,397	32.74%
2003	157,668	11.51%
2004	186,184	18.09%
2005	182,591	−1.93%
2006	198,488	8.71%
	Average Change/Year	11.52%
	Total Change	86.33%

A.3 – Japan Current Account Balance Graph



A.4 – Future and Forward premiums graph



A.5 – Short-term spot estimate arbitrage comparison

Starting amount($)	1000000
Current Spot (/$)	107.02
Estimated 90 day spot (Y/$)	112
Current Forward (Y/$)	106.412
Japan Interest rate	1.00871
U.S. Interest rate	1.03162
Number of Days(n/360)	0.25

$-Yen Perspective

	Convert to Yen	Stay in $	Arbitrage Potential
Covered	253619.02	257904.75	−4285.73
Uncovered	240965.09	257904.75	−16939.66

Starting Amount(Y)	1000000

Yen-$ Perspective

	Convert to Yen	Stay in Y	Arbitrage Potential
Covered	256439.38	252178.00	4261.38
Uncovered	269905.92	252178.00	17727.92

A.6 – Long-term spot estimate arbitrage comparison

Starting amount($)	1000000	
Current Spot (/$)	107.02	
Estimated 360 day spot (Y/$)	118	
Current Forward (Y/$)	104.644	*Recalculated Feb 5th for 1 year
Japan Interest rate	1.00871	
U.S. Interest rate	1.03162	
Number of Days(n/360)	1	

$-Yen Perspective

	Convert to Yen	Stay in $	Arbitrage Potential
Covered	1031619.31	1031619.00	0.31
Uncovered	914850.49	1031619.00	−116768.51

Starting Amount(Y)	1000000

Yen-$ Perspective

	Convert to Yen	Stay in Y	Arbitrage Potential
Covered	1008711.70	1008712.00	−0.30
Uncovered	1137460.68	1008712.00	128748.68

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