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THE TRANSFORMATION OF
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ABSTRACT

A first step in the "big-bang" deregulation of Japanese financial markets was the deregulation of the foreign exchange market on April 1, 1998. This paper examines how the bid-ask spread and conditional volatility in the yen/dollar foreign exchange market changed around the time of the deregulation. Intra-day data are analyzed with the following results: (1) Holding constant the effects of volume and volatility, the deregulation was associated with a convergence of Japanese quoted spreads toward those of other banks. (2) Modeling the persistence in volatility reveals that deregulation lowered conditional volatility.

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1. Introduction

The “Big Bang” of Japanese financial markets was proposed in November 1996 by the Hashimoto government. This was the beginning of the end to the “convoy” system—no failure and regulatory protection—that had ruled the Japanese financial markets since the end of the Second World War. It is a bold idea to deregulate and liberalize the financial sectors, if not belatedly.

There were three main objectives. First, the Big Bang aims at making the Japanese market more efficient and internationalized. The market will become more active and competitive, and users, such as the Japanese corporations and retail consumers, will be beneficiaries. Second, the Japanese institutions, with competitive pressures from foreign institutions, will have to become more efficient. Third, it would deflect the political pressures, representing vested interest, on the Ministry of Finance.

After the bubble burst, the Tokyo financial markets had been losing its steam. The Tokyo Stock Exchange lost more than half of its capitalization since the peak of the bubble (December 1989). There had been a mass exodus of foreign stock listings from the Tokyo Big Board. The trading volumes of the Tokyo foreign exchange market have not been growing in the 1990s, and Hong Kong and Singapore were catching up fast. The usage of the yen in Asia

has not grown as some economists had predicted, partly because of the cumbersome rules and regulations in Tokyo. The first motivation of the Big Bang was to stop the skidding of Tokyo as an (if not 'the') Asian financial center.

Making the Tokyo markets efficient does not necessarily mean that the Japanese institutions will flourish. If foreigners have a competitive advantage in financial products, then they will take greater market shares in Tokyo. It must be endured, the policy makers argued. However, it was hoped that intensified competition would make Japanese institutions more efficient and stronger. The second objective, which derives from the first one, was more nationalistic, but try to force Japanese financial institutions to try harder.

Although the objectives were unanimously hailed as appropriate and desirable, the timing of the announcement was not so obvious. The Ministry of Finance was heavily criticized for its role in first creating and then bursting the bubble and not guiding the banking industry through the sea of nonperforming loans. First, the Ministry tried to maintain the "convoy" system, not failing one bank by forcing banks to share the burden and allowing banks to postpone provisioning and sales of bad assets, and then abandoning it without an sufficiently funded safety net (deposit insurance system). The Big Bang is a constructive way to steer attention away from the sorry past to a bright future.

The rest of this paper will examine the contents of the Big Bang, discuss its likely effects, and present some econometric analysis of early indications in the foreign exchange market.

2. What is the Big Bang?

The Ministry described the spirit of the Big Bang as “fair, free, and global.” Obviously, the main objectives of the Big Bang are to make the Japanese financial markets more competitive and to provide Japanese institutions with more opportunities than fetters. When the Big Bang is implemented, transaction costs will be substantially reduced, and those who are using the Tokyo markets, mostly institutions in Japan, will benefit from deregulation. However, many observers point out that there may be more political (or political economy) objectives. First, the Big Bang is sequenced so that it will take some time to complete it, but will be carried through to the end. The foreign exchange controls were effectively eliminated on April 1, 1998. Nonfinancial institutions in Japan can deal in foreign exchange without banks’ intermediation. Moreover, Japanese investors are now allowed to open and maintain accounts with financial institutions in foreign countries. Without change, Japanese banks will lose a large chunk of formerly-protected businesses to New York and London. The Big Bang starting with the foreign exchange deregulation will ensure that the rest of the reforms will be carried through.

Politically, the Big Bang may have been a response to various scandals among the Ministry officials. The revelation that some high-ranking officials were caught in near-bribery scandals put the Ministry on the defensive. Proposing and carrying out a high-profile project like the Big Bang may deflect media attention. (Despite the effort, the Ministry of Finance continued to be criticized in the media, since new scandals erupted in 1997.)

The name Big Bang is misleading as the proposal is not a sudden change. The foreign exchange control was effectively eliminated in April 1998. But, other reforms in banking, securities, and insurance sectors are scheduled to follow. The accounting standard will also be changed, but that will take time, as public accountants have to be educated on the change first. Economic benefits from the Big Bang will extend to an entire financial sector and the economy in general when the reforms are completed.

Traditionally, domestic deregulation had been stalled by vested interests of segmented financial markets. The Big Bang is a final answer to deal with the crash of vested interests. Several examples will give a good picture of the financial markets problem and the proposed solution.¹

First, banks and securities firms are at odds. Banks opposed securities houses desire to make customers' securities accounts more like bank accounts (automatic deposits, demand deposits, and automatic payment services) –this was removed in the beginning of the 1990s.

¹ For the market structure before deregulation, see Ito (1992, chapter 5)

Second, Securities houses opposed banks' plan to sell mutual fund products at banks' teller windows—this was removed in December 1998.

Third, ordinary banks and long-term credit banks were squabbling over the ordinary banks' product line. Long-term credit banks opposed the ordinary banks' proposal to offer time deposits exceeding two years—this was removed in the mid-1990s.

In general “holding companies” are prohibited in Japan. Under the Big Bang, the establishment of financial holding companies will be permitted, so that banks, securities firms, and insurance companies may be controlled and coordinated by a single headquarter.

Insurance companies are segmented into three categories: Life insurance, non-life insurance, and the “third” category—such as cancer insurance. This segmentation will be lifted in March 2001, under the Big Bang.² Insurance premiums have been regulated and controlled. Under the Big Bang, companies can charge different premiums to different kinds of customers (e.g. non-smoker life insurance, drivers without accident records).

Among the changes in the foreign exchanges on April 1, 1998, the elimination of the exclusive dealing by banks is most prominent. Foreign exchanges had been exclusively exchanged in banks that are licensed to do dealings. Securities firms, trading houses, and other large nonfinancial

² United States pressure has been instrumental in much deregulation in Japan in the 1980s. However, it is ironic that the United States is now opposing deregulation of insurance segments in Japan, because AIG (a U.S. company) has a vested interest in the “third” market.

companies regularly receive both buying and selling orders of foreign exchange. However, they cannot offset (marry) their buy and sell positions, but ask banks to do the transactions. Then the banks automatically receive commissions. This restriction was removed on April 1, 1998 as a part of the Big Bang. In addition, investors are now allowed to hold accounts at financial institutions abroad. These changes have put additional competitive pressure on Japanese banks.

In order to disentangle the vested interest turf claims, the Big Bang—simultaneous or at least committed schedule of, deregulation—is the answer.

3. Political Economy

The Big Bang idea was an attempt of the Hashimoto government, with help from some quarters of the Ministry of Finance, to pursue structural reforms in domestic and international economic policy making. The domestic politics needed some banner for the Hashimoto government (since January 1996).

Public opinion had turned against the Ministry of Finance, as the final resolution of the insolvent *Jusen* (housing loans companies) required an injection of 685 billion yen, and some Ministry officials were alleged to have accepted cash and lavish entertainment.

During the summer of 1996, it was proposed to reform the Bank of Japan to make it more independent from the Ministry. This was considered to be a deflection of criticism.

The Big Bang had several additional political advantages. First, domestic resistance toward deregulation and liberalization would become less when a “declaration” for the big deregulation is made internationally. Second, it helps international negotiations. The U.S. had pressured Japan to “open up” the insurance market. In fact, the U.S. demands were aimed at keeping the Japanese insurance market under regulation. The so-called third market (for non-life insurance) was dominated by the U.S. insurance companies. As a result, the US opposed the deregulation of that market. The Big Bang basically set the deadline for allowing such vested interest.

Immediate impacts on various groups of consumers are unclear. Wealthy individuals will benefit from the wider-range of choices in their asset portfolios. However, small savers including pensioners may suffer from deregulation as the various rates (brokerage commissions, insurance premiums, bank monthly fees) will be differentiated for different types of customers.

We now turn to the statistical evidence on how the first step of the Big Bang, namely the foreign exchange market deregulation, is affecting the yen-dollar exchange rate market.

4. A First Look at the Deregulation of the FX Market

On April 1, 1998 the revised Foreign Exchange and Foreign Trade Control Law ended the monopoly of Japanese banks in Japanese foreign

exchange (FX) trading. Now other firms, such as general trading firms, and individuals may freely buy and sell foreign currencies. The law extends down to the retail level, where shops and restaurants may exchange foreign money for yen. The revised law also permits individuals to open and maintain foreign-currency-denominated bank and securities accounts in foreign countries.³ At first thought, it seems reasonable that the deregulation should generate a yen depreciation, as the interest rate in Japan was so much lower than in other countries. However, the expected effect on the volatility of the yen/dollar exchange rate is unclear.

In the weeks before the deregulation went into effect, market participants expressed the opinion that the yen should weaken as it will be easier for Japanese agents to sell yen for dollars. However, there were persistent rumors of central bank interventions, selling dollars to prevent the dollar appreciation, so it is possible that the effect of private market yen sales was offset by central bank purchases. There were also confounding factors, as the time of the deregulation was one where other important events were occurring. For instance, on April 3, Moody's Investors Service downgraded to "negative" from "stable" its outlook for Japan's government obligations. This news resulted in the yen/dollar exchange rate dropping to 135 for the first time in over six years. In the same week, the Bank of Japan's Tankan report indicated that the outlook had turned more negative among Japanese firms.

³ Even before the big bang, foreign-currency-denominated deposits could be made with Japanese or foreign financial institutions that were located in Japan.

So, it is clear that there was plenty of news to motivate yen selling around the time of the deregulation, so that one must be careful when making claims about the effects of the April 1 change. We will now turn to a first look at the empirical evidence related to the FX market big-bang.

Yen/Dollar Exchange Rate

With the lifting of restrictions on dollar-denominated deposits in foreign countries, we expect that pressures from abroad will force the Japanese and foreign institutions in Tokyo to offer better products. This may cause a shift to dollars from yen and a consequent yen depreciation. In a real sense, any such depreciation is reflecting expectations regarding the Japanese economy and financial market differences between Japan and the United States (like interest differentials and stock market performance). The deregulation should simply allow more Japanese firms and households to diversify their portfolios at lower cost. To see whether there was any discernible effect of deregulation on the yen/dollar exchange rate, we first plot the daily data in Figure 1. The figure indicates that in the week containing the deregulation, the yen depreciated against the dollar from about 130 to 135. However, there was a sharp appreciation in the following week which appears to have been a result of two factors. The Bank of Japan intervened in support of the yen and, reportedly, sold \$12 billion in exchange for yen on Thursday and Good Friday. At the same time, U.S. Treasury Secretary

Rubin stated that he supported the Bank of Japan action and was concerned about recent weakness in the yen. There was also an expectation among market participants of a coordinated intervention to support the yen following the G7 meeting scheduled for April 15. All of these factors contributed to the yen appreciation below 130 in the second week of April. However, as Figure 1 shows, by the third week of April, following no action by the G7, a steady yen depreciation began that peaked in June.

Aside from the yen appreciation prior to Easter weekend, it is clear that the yen depreciated over most of the period starting in mid-February. While this could have been due to expectations and the consequent realization of portfolio rebalancing following April 1, there was also plenty of bad news related to the Japanese economy that occurred at the same time.

Transaction Costs

One would expect that deregulation increases efficiency as banks face greater competition so that spreads and commissions on trading fall. There was anecdotal evidence that this occurred. Banks cut the foreign exchange commission charged to retail customers.⁴ Securities firms cut exchange rate commissions for preferred customers who purchase foreign-currency denominated bonds. Aside from such anecdotal evidence from the retail level, what do the data say about the wholesale interbank market?

We examined tick-by-tick data on the yen/dollar exchange rate for evidence regarding spreads.⁵ First, we plotted the average daily quoted bid-ask spreads for Japanese banks and all banks in Figure 2. It is interesting to note that the Japanese quoted spreads exceed the rest of the market. There may be several reasons why Japanese banks' spreads are wider. First, they may be just inefficient. Second, Japanese banks' reputation was categorically damaged when one of the 20 large banks failed in November 1997, and many others had been downgraded. The Japanese banks were charged a "Japan premium" by American and European banks. Credit lines were severely cut. Unless the Japanese banks offered a higher rate, they could not borrow. A look at the figure does not provide obvious evidence that the spreads narrowed following the April 1 deregulation. Neither the spreads of all quoters nor those of Japanese quoters systematically fell after April 1. Furthermore, it is not obvious that the spreads quoted by Japanese banks converged to those quoted by others following April 1.

The two spikes in the spread series for all quoters are related to specific events. The first spike occurring on March 13 coincides with the arrest of a senior BOJ official for leaking sensitive information and the ensuing corruption scandal. The second peak occurred on Good Friday (April 10). This is to be expected as there was heavy BOJ intervention on this day

⁴ For instance, at the end of March, Daiwa Bank reduced its exchange commissions so that it charges ¥28,000 to purchase \$10,000. This was ¥2,000 below the other Tokyo city banks. On April 6, Sanwa Bank cut its foreign-currency wiring fee by up to 2,300 yen.

and the Easter weekend is a 3-day holiday weekend in many countries. With much uncertainty regarding action by the G7 the next week and an extended market closing, we should expect the widening spreads. Note that spreads fell sharply the next week, following the lack of action by the G7.

To more formally examine the effect of the deregulation, we estimated econometric models of the spread. Microstructure models suggest that volume and volatility should both be important determinants of the spread.⁶ In addition, a dummy variable was added to estimate the impact of the April 1 deregulation. The dummy switches from zero to one on April 1. The model is estimated twice. First, we estimate the effect of volume, volatility, and deregulation on the average daily spread quoted by Japanese banks. Then the model is reestimated using the difference between the average daily Japanese quoted spreads and the average daily quoted spreads across all banks. The independent variables used in the estimation are as follows: (a) volume, the sum of daily volume in the spot and swap markets in Tokyo; (b) volatility, the absolute daily change in the yen/dollar spot rate; and (c) the dummy for deregulation. To account for the simultaneity in the data, an instrumental variables estimation was employed where the instruments included two lags of volume and volatility and a dummy variable for the April 10 intervention by the BOJ. A specification search revealed that a

⁵ The data were obtained from Olsen & Associates in Zurich and include the intradaily quotes over the first half of 1998.

⁶ See Hartmann (1998) for an analysis of the relationship between the tick-by-tick spread and trading volumes.

parsimonious representation of the data required a first- and second-order autoregressive term be included to account for the autocorrelation in the residuals.

The results are reported in Table 1. Volume seems to have no significant effect on either dependent variable. Volatility has a significantly positive effect on the Japanese quoted spread and no effect on the difference between Japanese and all spreads. The April 1 dummy has a negative and significant effect in both cases. So taking account of the volume and volatility effects on the spread, one can estimate a negative effect of deregulation on the quoted spread of Japanese banks. In addition, it appears that, holding constant the effects of volume and volatility, the deregulation was associated with a convergence of Japanese quoted spreads toward those of other banks.

The efficiency gains associated with FX market deregulation in terms of lower transaction costs, appears to extend beyond the retail level. The evidence presented here is supportive of a structural change in the wholesale exchange rate quotes consistent with lower transaction costs in Japan.

Volatility

The net effect that deregulation should have on FX volatility is unclear from the Figure. On the one hand, the entry of more participants might add depth and larger liquidity trades, so that that discrete price jumps occur less frequently. The usual case that volume and volatility are positively

correlated is, at least in part, a result of both being driven by news. It is not necessary that the deregulation will increase trading volume as firms can now take positions internally that were previously accomplished through bank trading rooms. This could result in thinner trading. The next section will examine the evidence on volume, here we look directly at volatility. Figure 3 plots the daily (9 a.m. to 4 p.m., Tokyo) return on the yen/dollar exchange rate. There is no clear pattern of volatility after April 1 compared to before. The negative spike on April 10 is associated with BOJ intervention. Since the table does not reveal any obvious effect of deregulation, we will examine more formal evidence.

It is well known that high-frequency exchange rate data exhibit GARCH effects.⁷ As a result, we do not want to simply look at the pattern of the unconditional volatility to make inferences regarding the path of volatility around April 1. Instead, we report estimates of GARCH models. We constructed a data set of 15-minute returns for the yen/dollar spot rate during Tokyo business hours, ensuring that no overnight or weekend returns were included. This is the dependent variable in the mean equation. As is usually the case in high-frequency exchange rate applications, a GARCH(1,1)-MA(1) model represented the data well. To test the hypothesis that the April 1 deregulation resulted in lower volatility, we included a dummy variable that switches from zero to 1 on April 1 in the conditional variance equation. To account for the volatility associated with the BOJ

intervention, an additional dummy variable was added that takes on the value of one for April 10.

Estimation results are reported in Table 2. The diagnostics indicate that the model represents the data well. The deregulation dummy is negative and significant at the 4 percent level. Thus, accounting for the persistence that exists in intradaily exchange rate quotes, we find evidence consistent with the deregulation reducing volatility.

Volume

Since non-bank firms can now hold dollar deposits after April 1, 1998, they can circumvent the bank exchange services and finance dollar deals directly. For this reason, we might expect that the volume of foreign exchange trading in Tokyo would fall with the April 1 deregulation. To explore the pattern of FX trading volume we examine the Bank of Japan data on daily volume. The BOJ collects daily data from brokers and dealers on interbank foreign exchange transaction volume. Spot volume for the first half of 1998 is plotted in Figure 4. Forward and swap volume is plotted in Figure 5. The spot volume data in Figure 4 indicate a clear outlier associated with the pre-Easter intervention. Aside from this, there appears to be an uneven decline in volume for about a month, after which volume starts to climb again. The swap market volume indicates a similar upward trend near the end of the sample.

⁷ See Andersen and Bollerslev (1997) for a survey.

To isolate the effect of deregulation on volume, we would ideally need to account for information flows as volume (and volatility) is driven by public and private information disclosure. Lacking data on such information flows, we experimented with alternative models of volume being driven by volatility and a dummy for the April 1 deregulation. There were no robust results linking volume to the deregulation. It appears that other factors dominate the volume effect.

Overall Effects of Deregulation on FX Market

Based on our look at the wholesale interbank FX market, we can discern the following:

(1) There is evidence of lower transaction costs associated with yen/dollar trading. The data suggest that, holding constant the effects of volume and volatility, the bid-ask spread drops on yen/dollar quotes. In addition, the difference between spreads quoted by Japanese and non-Japanese quoters narrows after the deregulation.

(2) There is evidence that the deregulation lowers conditional volatility.

While the direct effect of deregulation on volatility is unclear, the data indicate that a GARCH framework that takes account of the persistence in volatility and intervention captures a negative effect.

We urge caution in interpreting these results as there were many factors affecting the exchange rate over this period and deregulation was but

one. Nevertheless, it is useful to know that the effects of deregulation extend beyond the retail level of FX that has been discussed in the popular press.

5. Concluding Remarks

The Big Bang alone will not be enough to put the Tokyo financial markets to the status at par with New York and London, or to make the yen an international key currency.⁸ However, it is an important first step. When accompanied by tax law changes and improvement in financial infrastructure, complete deregulation on business activities, known as the Big Bang, will increase financial activities in Tokyo (by both Japanese and non-Japanese institutions), and will boost the use of the yen. However, it remains to be seen whether these changes are made in time.

This paper examined how the bid-ask spread and conditional volatility in the yen/dollar exchange market changed at around the time of deregulating the foreign exchange law. Some evidence of an impact of deregulation on the market activities was detected. However, whether the econometric evidence can be translated into more tangible results in the long run is obvious. The answer partly depends on the success of the remaining changes scheduled under the Big Bang.

⁸ For steps toward internationalization of the yen, see Ministry of Finance (1999).

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Table 1
Yen/Dollar Spreads

<u>Independent Variable</u>	<u>Japanese Quotes</u>	<u>Japanese-All Quotes</u>
Constant	0.0836 (0.00)	0.0006 (.97)
Volume	1.6×10^{-7} (0.69)	7.8×10^{-7} (0.13)
Volatility	2.657 (0.00)	-0.947 (0.24)
Dummy (deregulation)	-0.008 (0.00)	-0.009 (0.00)
AR(1)	0.2990 (0.00)	0.3376 (0.00)
AR(2)	0.4376 (0.00)	0.3464 (0.00)
<hr/>		
F	4.49 (0.00)	7.06 (0.00)
SSR	0.0055	0.0061
Q(24)	18.90 (0.65)	23.34 (0.38)

Note: p-values in parentheses
Daily data for January 1998 to June 1998

Table 2
Yen/Dollar Conditional Volatility

<u>Independent Variable</u>	<u>Coefficient</u>	<u>P-value</u>
<i>Mean equation:</i>		
Constant	0.1117	0.04
MA(1)	-0.819	0.01
<i>Conditional Variance equation:</i>		
Constant	3.3402	0.00
ARCH(1)	0.2654	0.00
GARCH(1)	0.6216	0.00
Dummy (deregulation)	-1.062	0.04
Dummy (intervention)	26.12	0.09
<hr/>		
SSR	4.448	
Log Likelihood	-11126	
Q(24)	29.24 (0.17)	

Note: p-values in parentheses
15-minute data from January 1998 to June 1998

Figure 1: Yen/Dollar Spot Exchange Rate

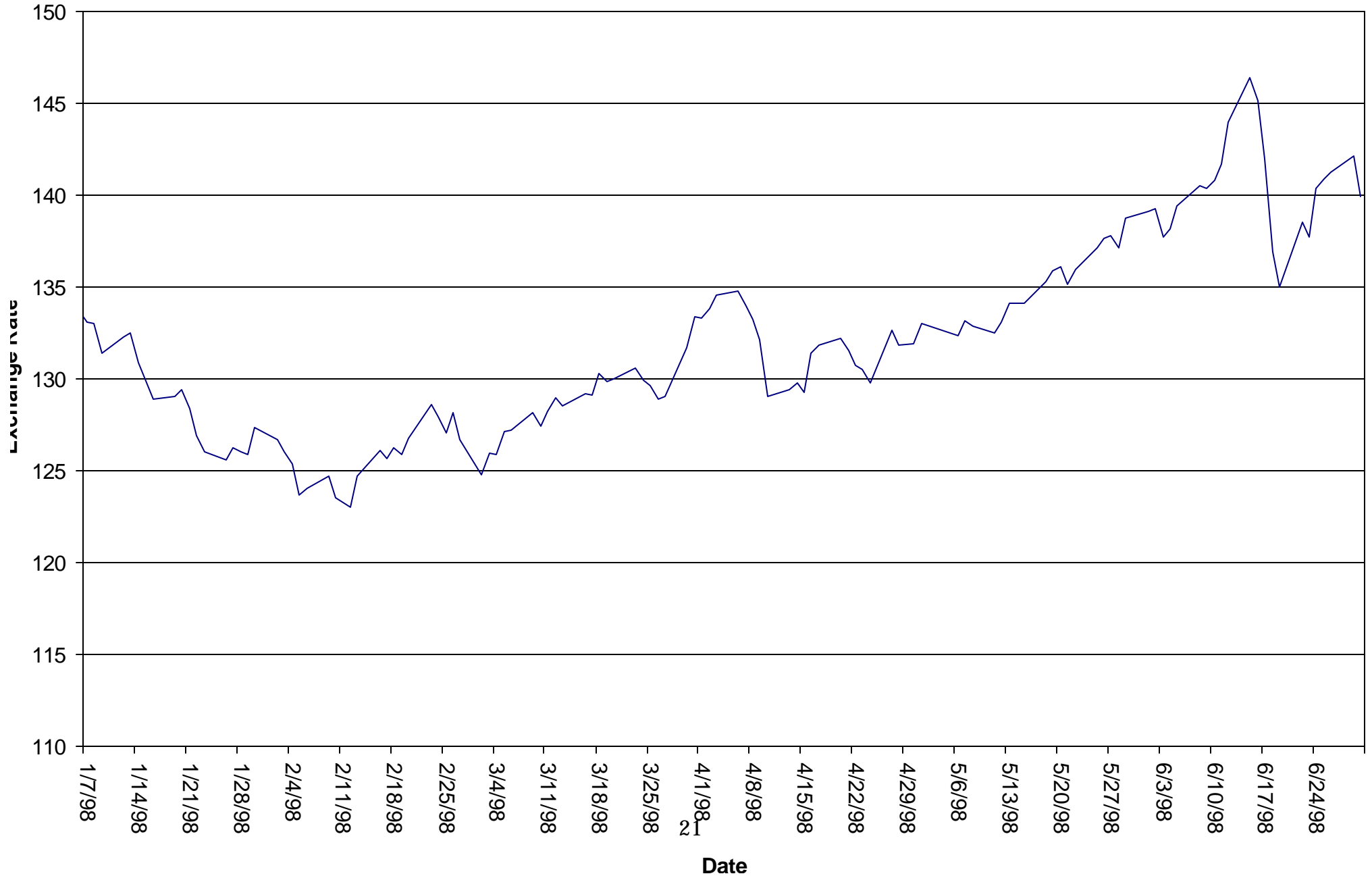


Figure 2: Average Daily Bid-Ask Spread of Yen/Dollar

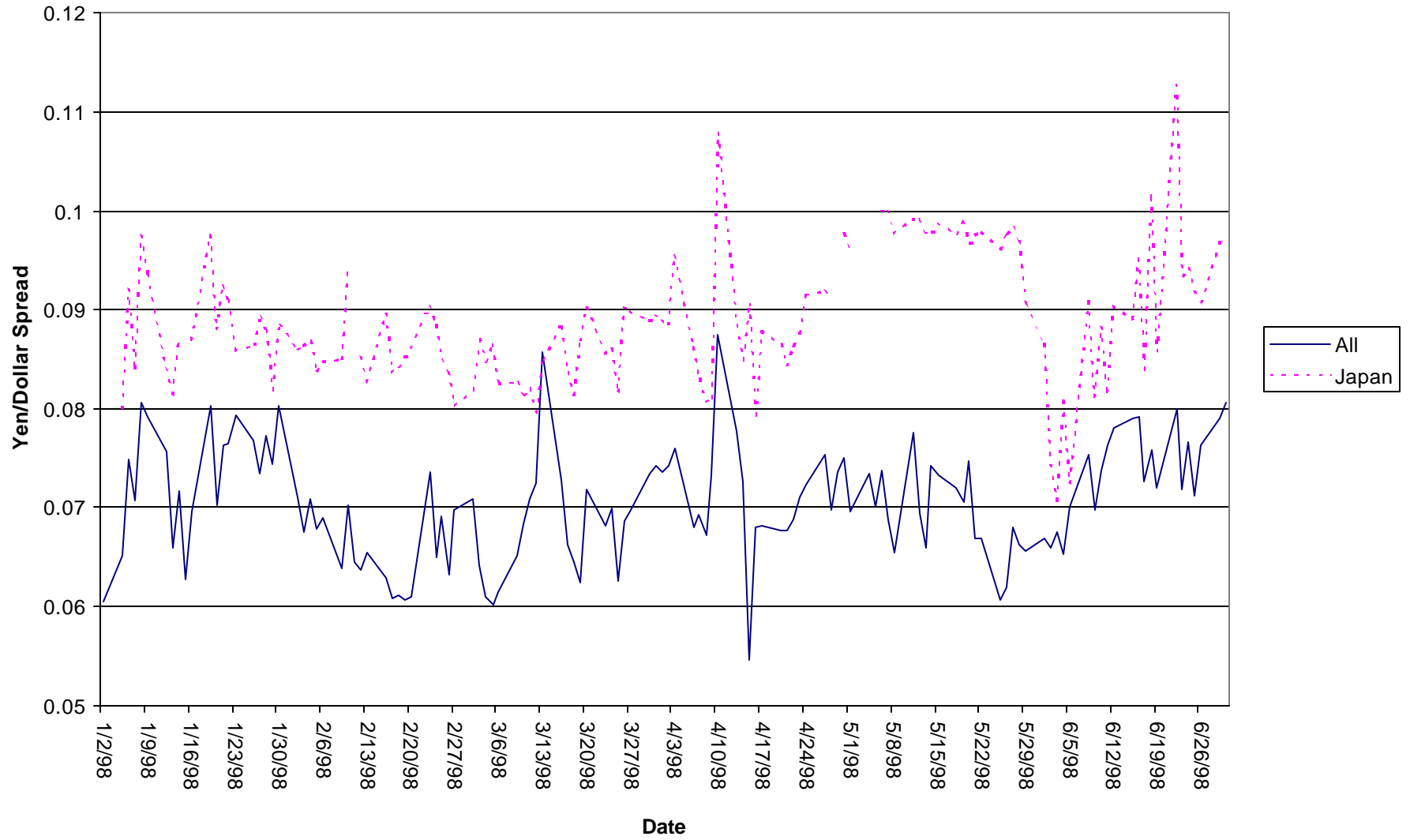


Figure 3: Daily Yen/Dollar Return

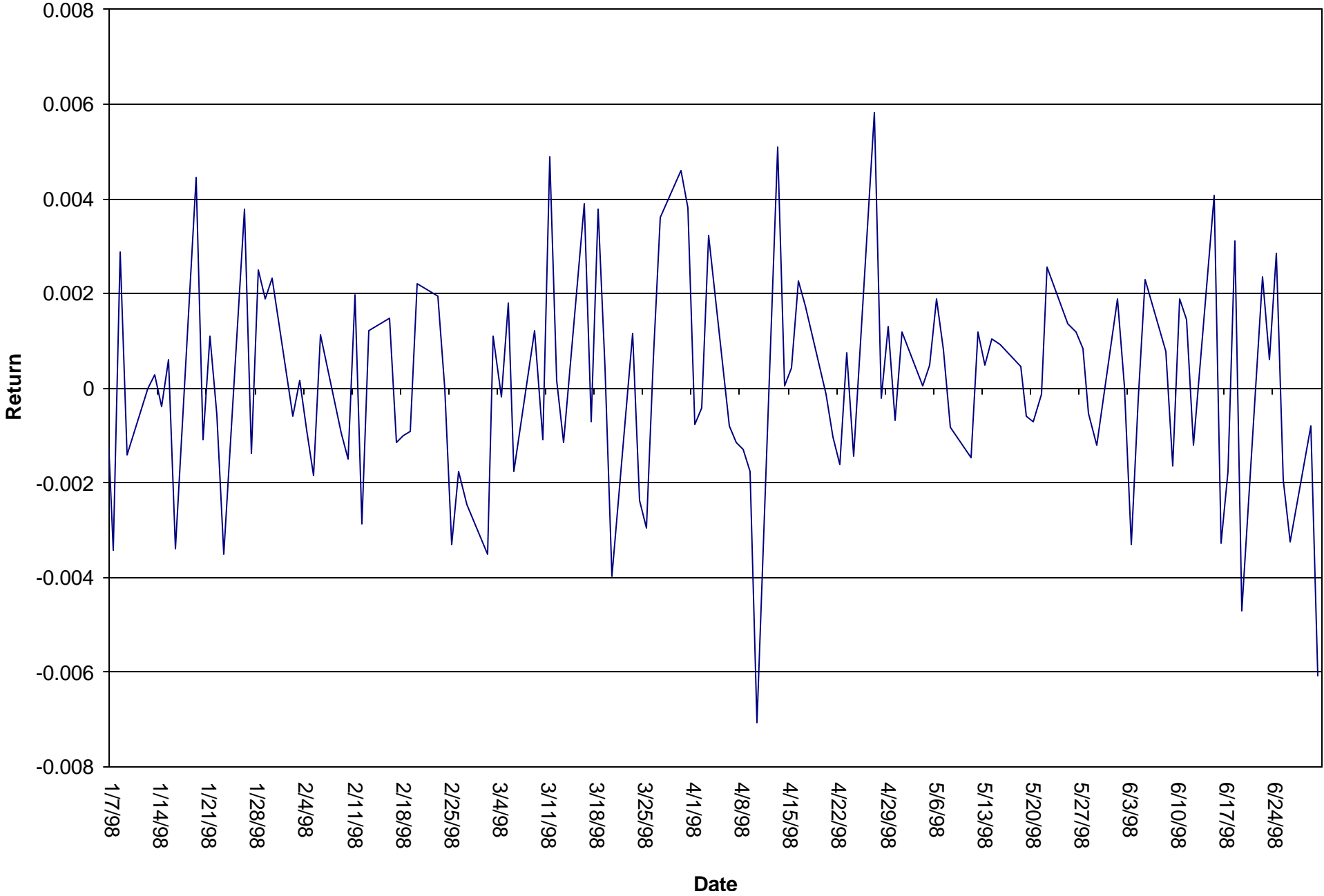


Figure 4: Daily Spot Market Volume (million yen)

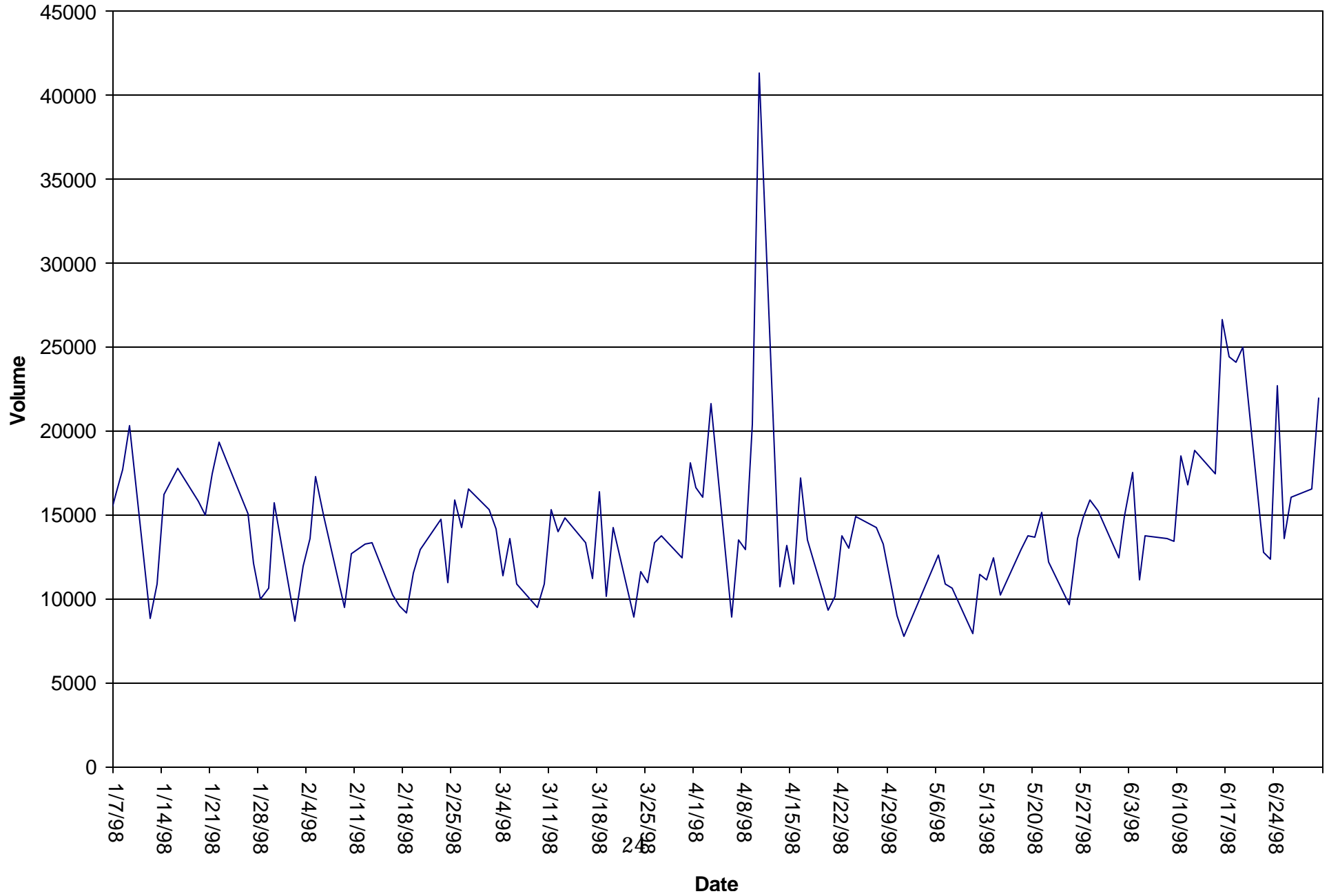


Figure 5: Daily Swap Market Volume (million yen)

